

# Answer to the public consultation of the BEREC about Common characteristics of Layer 2 Wholesale Access Products in the European Union

BoR PC02 (15) 12

## What is at stake?

Do we still want incumbents being challenged by alternative operators on innovations in the next decade?

**Colt thanks the Body of European Regulators for Electronic Communications (BEREC) for its initiative on L2 WAP. However Colt stresses that L2 WAP must be considered as a Plan B only after every regulatory measure to enforce (actual) physical access have failed on Copper and/or on Fibre.**

Why?

L2 WAP are active products. As a consequence, the improvement of the features of such products rely on the time frame of regulatory debates and decisions. On average, achieving effects through regulation requires 3 years in the most advanced countries to enforce a given new feature/technology and the double to ensure full European convergence.

L2 WAP is in line with this average time frame:

- In 2007, Colt decided to upgrade its network standard to Carrier-Grade Ethernet to deliver transparency, security and the latest level of bandwidth to its wholesale and retail customers
- 3 years later, in 2010, initial L2 WAP products compliant with Carrier-Grade Ethernet have appeared from some incumbents
- 8 years later, in 2015, BEREC is issuing a public consultation about Layer 2 Wholesale Access Product (L2 WAP) that aims to bring to the market the exact same features than those delivered by Colt since 2007.

Physical access enables Alternative Operators to bring innovation in the competition dynamics. For instance, for half a dozen years now, Colt's ULL footprint across Europe is offering actual L2 WAP including especially the critical feature of VLAN stacking and transparency. This was only possible because we had access to the unbundled network components.

As opposed to the products provided by Colt using physical access, many incumbents are still not compliant with the key features required by L2 WAP international standards.

**From the economic point of view, L2 WAP for data access is not better (and not worse) than Wholesale Line Rental (WLR) for voice access.** This traditional voice access enables Alternative Operators to extend the coverage of their voice services in an economic way ... as long as they are able to work with a legacy technology, without any flexibility to deliver more innovative products (such as Voice over IP for instance).

Within Colt, our primary focus is no longer on L2 WAP, but **Software Defined Networks (SDN)**. **We have already deployed several SDN features during the last 18 months and more are to come in the coming year for our customers – however only on our own footprint and on our (actual) ULL footprint.**

We commit to contribute as much as needed to help regulatory bodies to decide the necessary interoperability measures to enable SDN to work on third party networks. Even if it is challenging to shorten the average regulatory time frame, perhaps we will be able together to beat this average for SDN interoperability.

## Colt's contribution to the draft benchmark

Colt has collected data across Europe to present its own inputs regarding the 9 criteria defined by BEREC. As is shown below, our data collection matches with most of the data published in the draft BEREC report. We remain at your disposal for any questions or insight about these data.

In addition, Colt proposes a tenth criterion for L2 WAP across Europe: the Virtual LAN (VLAN) stacking feature. It is a key feature, especially for the wholesale market.

Why is VLAN stacking so important?

Carrier Grade Ethernet networking requires VLANs to function; a VLAN enables to create a “virtual network connection” between 2 points. Essentially, it allows the creation of a network-within-a-network.

VLAN stacking enables an operator to install its own VLANs within the VLANs of the wholesale access provider – e.g. it enables the operator to manage the Ethernet connection **fully transparently** with its own naming convention and parameters for VLANs. This can apply in a wholesale-retail relationship (access taker uses access to deliver a retail service) but also in a wholesale-wholesale relationship (access taker uses access to deliver a wholesale service to another operator or to a systems integrator).

Today more and more IT units of large companies are requiring the capability to manage their VLANs. As a consequence, the service provider must be able to provide one level of VLAN to its customer, sometimes two levels.

A lively and dynamic wholesale market requires that infrastructure operators provides 3 to 4 levels of VLANs to retail operators: 1 level for the retail operator itself and 1 to 2 levels for the customer.

Based on our internal assessment, it appears that the current L2 WAP products in Italy, The Netherlands, Spain and the United Kingdom are not compliant today with international standards (especially Metropolitan Ethernet Forum (MEF)), especially regarding VLAN stacking.

## Inputs per country

### Belgium

#### A. Available L2 Wholesale Access Product from the incumbent (Local delivery – COs)

Not available

#### B. Available L2 Wholesale Access Product from the incumbent (Regional/National)

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>	WBA	WBA VDSL2
<b>Number of Points of Handover (PoH)</b>	5	2 PoH in 5 areas for redundancy
<b>Average number of inhabitants covered by a Point of Handover</b>	2 million	
<b>0.Regulated?</b>	Yes	Regulated on former market 5 (now 3b)
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	Yes	
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	Yes	
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	Yes	
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	Yes	Colt can choose the backbone VLAN
<b>5. (empty)</b>		
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	Yes	p-bit can be chosen
<b>7. (empty)</b>		
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	Yes	
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	Yes	
<b>10. VLAN Stacking</b>	Yes	4 levels

## Denmark

## A. Available L2 Wholesale Access Product from the incumbent (Local delivery – COs)

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>	VULA	Contended and uncontended version
<b>0. Regulated?</b>	Yes	Regulated on former market 4 (now 3a)
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	Yes	
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	Yes	The uncontended version is available from SC or CO
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	Yes	TFFC architectures. TDC must supply a list of supported CPEs.
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	Yes	
<b>5. (Quality of Service):</b> <i>The L2 WAP provides at least ostensibly uncontended bandwidth or a bandwidth with a defined QoS.</i>	No	No specific requirements.
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	Yes	
<b>7. (Number of VLANs):</b> <i>The L2 WAP provides several VLANs per end user unless additional wholesale products are available.</i>	Yes	Up to 7
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	Yes	
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	Yes	
<b>10. VLAN Stacking</b>	Yes	3 levels

**B. Available L2 Wholesale Access Product from the incumbent  
(Regional/National)**

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>	VULA	Contended version
<b>Number of Points of Handover (PoH)</b>	1	
<b>Average number of inhabitants covered by a Point of Handover</b>	5.6 mil	Whole Denmark
<b>0.Regulated?</b>	Yes	Regulated on former market 4 (now 3a)
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	Yes	
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	Yes	
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	Yes	
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	Yes	
<b>5. (empty)</b>		
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	Yes	
<b>7. (empty)</b>		
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	Yes	
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	Yes	
<b>10. VLAN Stacking</b>	Yes	

## France

**A. Available L2 Wholesale Access Product from the incumbent (Local delivery – COs)**

Not available but compensated by ULL access except for Fibre ULL in the unregulated area.

**B. Available L2 Wholesale Access Product from the incumbent (Regional/National)**

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>	<b>CELAN</b>	
<b>Number of Points of Handover (PoH)</b>	<b>24</b>	
<b>Average number of inhabitants covered by a Point of Handover</b>	<b>2.4 million</b>	
<b>0.Regulated?</b>	<b>Yes</b>	
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	<b>Yes</b>	
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	<b>Yes*</b>	*: CELAN Copper is based on Copper Local loop (available everywhere), CELAN Fibre is based on FTTO infrastructure, not FTTH
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	<b>Yes</b>	
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	<b>Yes</b>	
<b>5. (empty)</b>		
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	<b>Yes*</b>	3 levels of service available: contended, guaranteed speed, several classes of service on a given connection
<b>7. (empty)</b>		
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	<b>Yes</b>	1 connection = 1 VLAN
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	<b>Yes</b>	Direct communication between end users based on layer 2 is enabled.
<b>10. VLAN Stacking</b>	<b>Yes</b>	Up to 4 levels

## Italy

## A. Available L2 Wholesale Access Product from the incumbent (Local delivery – COs)

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>	<b>Bitstream Ethernet / NGA (VULA)</b>	Validated by Colt for L3 Services only (IP Access, IPVPN)
<b>0 .Regulated?</b>	<b>Yes</b>	
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	<b>Yes</b>	VULA: EFM (ENNI with ANO at CO level to TI's DSLAM)
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	<b>Yes</b>	
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	<b>Yes</b>	FTTC (and FTTH in Milan only)
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	<b>Yes</b>	
<b>5. (Quality of Service):</b> The L2 WAP provides at least ostensibly uncontended bandwidth or a bandwidth with a defined QoS.	<b>Yes</b>	With defined CoS
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	<b>Yes</b>	With defined CoS
<b>7. (Number of VLANs):</b> The L2 WAP provides several VLANs per end user unless additional wholesale products are available.	<b>Yes</b>	Support of 2 VLAN stacks
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	<b>Yes</b>	With VLAN
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	<b>No</b>	
<b>10. VLAN Stacking</b>	<b>Yes</b>	2 levels



**B. Available L2 Wholesale Access Product from the incumbent  
(Regional/National)**

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>	<b>Bitstream Ethernet / NGA (VULA)</b>	<b>Validated by Colt for L3 Services only (IP Access, IPVPN)</b>
<b>Number of Points of Handover (PoH)</b>		30 Macro Area for regional access
<b>Average number of inhabitants covered by a Point of Handover</b>	<b>2 million</b>	
<b>0. Regulated?</b>	<b>Yes</b>	
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	<b>Yes</b>	NGA: Ethernet over MPLS in the Core + EFM
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	<b>Yes</b>	
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	<b>Yes</b>	FTTC (and FTTH in Milan only)
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	<b>Yes</b>	
<b>5. (empty)</b>		
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	<b>Yes</b>	With defined CoS
<b>7. (empty)</b>		
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	<b>Yes</b>	With VLAN
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	<b>No</b>	
<b>10. VLAN Stacking</b>	<b>Yes</b>	2 levels



## Netherlands

## A. Available L2 Wholesale Access Product from the incumbent (Local delivery – COs)

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>	VULA	
<b>0. Regulated?</b>	No	Not yet, to be re-proposed by ACM Q3 2015 under market 3a, answers on characteristics based on ACM draft 2014
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	Yes	
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	Yes	196/158 POI's. Only KPN and T2 present at those POI's
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	Yes	
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	Product not defined yet	BEREC answer corresponds to ACM draft 2014: Multiple profiles, at least the same as KPN offers its retail customers, and possibility to ask for additional profiles. In line with ACM draft 2014.
<b>5. (Quality of Service):</b> The L2 WAP provides at least ostensibly uncontended bandwidth or a bandwidth with a defined QoS.	Product not defined yet	
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	Product not defined yet	
<b>7. (Number of VLANs):</b> The L2 WAP provides several VLANs per end user unless additional wholesale products are available.	Product not defined yet	
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	Product not defined yet	
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	Product not defined yet	
<b>10. VLAN Stacking</b>	Product not defined yet	

**B. Available L2 Wholesale Access Product from the incumbent  
(Regional/National)**

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>		KPN Wholesale Broadband Access Ethernet Pt-Pt
<b>1. Regulated?</b>		Not “officially”, product designed by KPN to replace WBA ATM, which was regulated under market 5
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	Yes	
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	Yes	196/158 POI's. Only KPN and T2 present at those POI's. Also, single WAP handover available (can be combined with WEAS – Ethernet Layer2 including modem) commercially
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	Yes	
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	Yes	
<b>5. (Quality of Service):</b> <i>The L2 WAP provides at least ostensibly uncontended bandwidth or a bandwidth with a defined QoS.</i>	No	The definition of QoS is not fully clear, it only says that p-bits of 5 get a higher priority than p-bit 1. P-bit can only be set on the downstream. P-bit will only be used during congestion in the access and not in the core. In paragraph 2.7.2 of the description it talks about Premium and Lite Cos with typical values for throughput, delay, jitter and frame loss. This only for E2E (VDSL) and not A2E (ADSL).
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	No	See point 5
<b>7. (Number of VLANs):</b> <i>The L2 WAP provides several VLANs per end user unless additional wholesale products are available.</i>	Yes	Max 8 VLANs per End User Access Point (including mgmt VLAN) are supported but p-bits are not transparent in upstream. Untagged frames are not supported. In paragraph 3.2.4 it says that untagged are supported with Ethernet over Fibre.
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	Yes	Yes with a VLAN but very limited MAC address support (typical 2 per VLAN)
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	Yes	
<b>10. VLAN Stacking</b>	Unclear	Unclear, KPN writes “Ethernet transparent, but framesize is lower and no p-bit transparency”

## Spain

**A. Available L2 Wholesale Access Product from the incumbent (Local delivery – COs)**

Not available

**B. Available L2 Wholesale Access Product from the incumbent (Regional/National)**

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>		ORLA - E
<b>0. Regulated?</b>	<b>Yes</b>	
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	<b>Yes</b>	
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	<b>Yes</b>	It is available in all areas/provinces, but in some addresses only.
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	<b>Yes</b>	
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	<b>Yes</b>	In the CPE
<b>5. (Quality of Service):</b> <i>The L2 WAP provides at least ostensibly uncontended bandwidth or a bandwidth with a defined QoS.</i>	<b>Yes</b>	
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	<b>Yes</b>	If configured on top, not by default
<b>7. (Number of VLANs):</b> <i>The L2 WAP provides several VLANs per end user unless additional wholesale products are available.</i>	<b>Yes</b>	The customer may have several VLANs under the SVLAN used by Colt for that customer in particular
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	<b>Yes</b>	
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	<b>Yes</b>	
<b>10. VLAN Stacking:</b> VLAN stacking enables Colt and then the customers of Colt to configure its own VLAN within the VLAN of the infrastructure operator	<b>Yes</b>	The regulated offer supports stacking. The limits depend on the standard IEEE 802.1ad for the frame. 4 levels of stacking are available.

## United Kingdom

## A. Available L2 Wholesale Access Product from the incumbent (Local delivery – COs)

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product / Regulated?</b>	<b>Yes</b>	GEA-FttC
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.	<b>Yes</b>	Ethernet
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.	<b>Yes</b>	Available once covered by BT.
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.	<b>Yes</b>	Only for FttC
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.	<b>Yes *</b>	*Only <b>Asymmetric</b> Bandwidths available:  FTTC/FTTP: 40/2, 40/10, 80/20  FTTP only: 220/20, 330/30
<b>5. (Quality of Service):</b> <i>The L2 WAP provides at least ostensibly uncontended bandwidth or a bandwidth with a defined QoS.</i>	<b>Yes but limited</b>	As BEREC mentions footnote 85: "BT Openreach dimension so as to ensure frames within the prioritization rate are not dropped. As such this bandwidth can be seen as ostensibly uncontended". There are indeed priority rates (Prioritisation rate 15 Mbps (for 40Mbps peak) or 30 Mbps (80Mbps) or maximum speed of line if lower) to prioritise one traffic over another and avoid any dropping. <b>This is an emulation of an uncontended service not an actual one.</b>
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.	<b>Yes</b>	5/2 (down/up) priorities based on p-bits
<b>7. (Number of VLANs):</b> <i>The L2 WAP provides several VLANs per end user unless additional wholesale products are available.</i>	<b>Possible</b>	1 or more. A second C-VLAN will typically be used for voice on FTTP.
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.	<b>Yes</b>	DHCP option. This is based in the port and DSLAM identifier.
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.	<b>Yes</b>	Layer-2 switched service. MAC learning for ELAN VPLS option only. Limit of 2000 MACs per CUG.
<b>10. VLAN Stacking</b>	<b>Yes</b>	Transparent for 2 VLAN stacks. Supported frame size is 1528.

**B. Available L2 Wholesale Access Product from the incumbent  
(Regional/National)**

Characteristic	Yes/No	Comment / Proposed Sub-characteristics
<b>Name of the Product</b>	<b>GEA</b>	(from BT Wholesale)
<b>Number of Points of Handover (PoH)</b>	<b>Circa 5</b>	
<b>Average number of inhabitants covered by a Point of Handover</b>		It is for a national coverage (ie when covered by NGA)
<b>0.Regulated?</b>	<b>No</b>	
<b>1. (Technology):</b> The L2 WAP is based on Ethernet.		Same as above
<b>2. (Availability):</b> The L2 WAP is (or will be) available at least in NGA rollout areas.		Same as above
<b>3. (CPE/Modem):</b> ANOs can use and configure their own CPE/modems at least in case of FTTC/B.		Same as above
<b>4. (Bandwidth):</b> ANOs have the possibility to control the speed of their services within the limit(s) of the bandwidth profile(s) of the subscriber access line.		Same as above
<b>5. (empty)</b>		
<b>6. (Traffic Prioritisation):</b> The L2 WAP supports different traffic priorities.		Same as above
<b>7. (empty)</b>		
<b>8. (Customer Identification):</b> The L2 WAP enables ANOs to identify their end users.		Same as above
<b>9. (Security):</b> The L2 WAP enables ANOs to apply security measures.		Same as above
<b>10. VLAN Stacking</b>		Same as above