

CONSULT21



BRIEFING

Multi-Service Interconnect Link (MSIL) - VLAN technical specification

Issue 3: Briefing Number C21-NS-019

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IMPORTANT NOTE

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1 Scope

This document contains the draft technical specification for the MSIL VLAN. The technical specification, when agreed with CPs, will form part of the Terms and Conditions of the MSIL. This draft technical specification is provided to CPs for information and to invite comment on the technical detail. It is hoped that it will be possible to resolve any comments email or by use of a technical experts meeting. If it is not possible to resolve any comments in this way, it might be necessary to move to a formal consultation document.

2 Comments

Any comments should be forwarded to Steve Wright (steve.p.wright@bt.com) and copied to Owen Gardner (owen.gardner@bt.com) by 31st August 2007

3 VLAN Specification for Interconnect

3.1 Physical Interface Specification

3.1.1 100Mbit/s

	In-Band / In-Span Handover	Customer Sited Handover*
SIN	-	436
Link Type	100BaseFX	1000BaseLX
Speed	100 Mbit/s	100 Mbit/s
Fibre Type	1310 nm Multi-Mode	1310 nm Single-Mode
Max Route Distance	2 km	40 km (25 km radial)
Auto-Negotiation	Disabled (100M Full-Duplex)	Enabled
OAM (802.3ah)	Not currently available	Not currently available
Maximum Frame Size	2000 bytes	1548 bytes
LAG Resilience	Not currently available	Not currently available

*CSH for 100BaseFX is not yet available. In the interim this shall be delivered using a Gigabit Ethernet Openreach product

3.1.2 1Gbit/s

	In-Band / In-Span Handover	Customer Sited Handover
SIN	360 (though EX and ZX not included)	436
Link Type	1000BaseLX, EX or ZX	1000BaseLX
Speed	1000 Mbit/s	1000 Mbit/s
Fibre Type	LX 1310 nm Single-Mode EX 1310 nm Single-Mode ZX 1550 nm Single-Mode	LX 1310 nm Single-Mode
Max Route Distance	LX 10 km EX 40 km ZX 70 km	40 km (25 km radial)

Auto-Negotiation	Enabled	Enabled
OAM (802.3ah)	Not currently available	Not currently available
Maximum Frame Size	9000 bytes	1548 bytes
LAG Resilience	Not currently available	Not currently available

3.1.3 10Gbit/s

	In-Band / In-Span Handover	Customer Sited Handover
SIN	360 (though only includes LR and LW)	460
Link Type	10GBaseLR/LW, ER/EW and ZR/ZW	10GBaseLR/LW
Speed	10000 Mbit/s	10000 Mbit/s
Fibre Type	LR/LW 1310 nm Single Mode ER/EW 1550 nm Single Mode ZR/ZW 1550 nm Single Mode	LR/LW 1310 nm Single Mode
Max Route Distance	LR/LW 10 km ER/EW 40 km ZR/ZW 80 km	40 km (25 km radial)
Auto-Negotiation	Not Applicable	Not Applicable
OAM (802.3ah)	Not currently available	Not currently available
Maximum Frame Size	9000 bytes	9000 bytes
LAG Resilience	Load-Sharing LAG. LACP is not used.	Load-Sharing LAG. LACP is not used.

3.2 VLAN Interface Specification

VLAN TPID	0x8100
Maximum Number of VLANs	4094 except for 100 Mbit/s MSIL where limit is 20
VLAN ID Range	VLAN IDs are taken from the range 1 - 4094
“QinQ” Support	Only the outermost VLAN will be interpreted
OAM (802.1ag)	Not currently available
Bandwidth Definition	Each VLAN is assigned a bandwidth. The Bandwidth includes all fields of the 802.3 frame. It does not include the inter-frame gap, preamble or start of frame delimiter. The inter-frame gap (IFG), preamble and start of frame delimiter (SFD) must be taken into consideration when calculating the physical utilisation of the MSIL.

<p>Bandwidth Planning</p>	<p>The MSIL is not over-booked. The total physical utilisation of the MSIL must be less than 100%. The physical utilisation must consider the overheads of the IFG, preamble and SFD.</p> <p>The exact limit to which the MSIL can be utilised is dependant on the mix of services and the protection required for delay/jitter sensitive traffic. BT recommends the following utilisation limits:</p> <p>Voice services only 95% physical utilisation limit</p> <p>Mix of Voice and Data services 90% physical utilisation limit</p> <p>Data services only 98% physical utilisation limit</p> <p>CP's, through bi-lateral agreement, may choose other limits, but they must understand the potential impact to delay and jitter this may cause.</p> <p>The services using the MSIL may have their own planning rules in terms of for how much of the VLAN bandwidth they can consume (e.g. VoIP call limits).</p>
<p>Classification</p>	<p>Classification is based on the VLAN ID and not on the 802.1p bits. The 802.1p bits are not used and, if set to anything other than "0" are ignored. Each VLAN has a bandwidth assigned to it and it is assigned in to a class. This classification occurs on ingress to each CP's network and each CP may classify the traffic independently of other CPs.</p> <p>CPs are free to implement as many classes as they wish. The minimum requirement is for two classes to exist. One for delay and jitter sensitive traffic and another for other traffic. Further work is recommended through the NICC to investigate the standardisation of a set of classes that all CPs can support on an MSIL.</p>
<p>Scheduling</p>	<p>CPs are free to implement any scheduling algorithms they see fit for the classes that they have chosen to implement. It is the responsibility of the CP to manage the latency of the traffic being transmitted in to the MSIL.</p> <p>The minimum recommendation is for one class (for delay and jitter sensitive traffic e.g. Media traffic) to be strictly prioritised over other classes. Further work is recommended through the NICC to investigate the standardisation of a set of classes that all CPs can support on an MSIL.</p>

<p>Policing</p>	<p>At the ingress to the CP's network, each VLAN may have a policer applied to it. The bandwidth parameter of the policer must be equal to or greater than the bandwidth assigned to the VLAN.</p> <p>BT will set the bandwidth parameter slightly greater than the bandwidth assigned to the VLAN (e.g. 1% greater). This may be subject to the network equipment's policer tolerance. This is to account for differences between one CP's shaper and another CP's policer. It is suggested that CPs set their policer to be greater than the bandwidth parameter by a similar small margin.</p> <p>If the equipment being used polices traffic using a different bandwidth definition to the one given above then some adjustment of the bandwidth parameter may be necessary.</p> <p>Policers commonly work on token-bucket principles and need to be configured with a burst-size parameter. Due to the difficulty of determining precise expected limits on traffic burstiness, a burst-size should be chosen that is considerably generous in relation to foreseen burst levels. The recommended burst size permitted through the policer is suggested to be;</p> <p><i>Burst-tolerance(bytes) = 0.03(s) x VLAN-Bandwidth(bit/s) / 8,</i> <i>capped to 150kbytes for VLANs up to 100Mbps, and to 1Mbyte for VLANs up to 1Gbps.</i></p> <p>If a different burst tolerance is used then this must be specified by the CP. Note that burst-levels as high as allowed by this formula are not necessarily compatible with achieving low latency, especially for voice services. Note also that this burst-limit applies to the MSIL itself, and that individual services may impose tighter limits.</p>
<p>Shaping</p>	<p>At the egress of the CP's network, each VLAN may have a shaper applied to it. The bandwidth parameter of the shaper should be configured to the bandwidth assigned to the VLAN. Though this may be subject to the network equipment's shaper tolerance.</p> <p>The burst size permitted through the shaper should be less than or equal to the burst tolerance given above under "Policing".</p> <p>If the equipment being used shapes traffic using a different bandwidth definition to the one given above then some adjustment of the bandwidth parameter may be necessary.</p>

4 History

Issue	Date	Author	Comment
1	2 July 2007	Steve Wright	
2	11 th July 2007	Steve Wright	Add in extra information re policing.
3	27 th July 2007	Steve Wright	Corrected 10G