

Interlaken Interoperability Recommendations

31 October 2007

Revision 1.0

Contents

Contents	2
Revision History.....	3
1 Overview.....	4
2 Interoperability Recommendations	5
2.1 Definitions of Interoperability Parameters.....	5
2.2 Recommendations for All Transfer Rates	6
2.3 10Gb/s Packet Transfers	6
2.3.1 Target Applications.....	6
2.3.2 Recommendations.....	6
2.4 20Gb/s Packet Transfers	7
2.4.1 Target Applications.....	7
2.4.2 Recommendations.....	7
2.5 40Gb/s Packet Transfers	8
2.5.1 Target Applications.....	8
2.5.2 Recommendations.....	8
2.6 100Gb/s Packet Transfers	8
2.6.1 Target Applications.....	8
2.6.2 Recommendations.....	9
2.7 Multirate Interoperability	9

Revision History

Revision 1.0 Revision Date: 31 October 2007
<ul style="list-style-type: none">• First release.

1 Overview

The Interlaken protocol specification addresses a wide range of chip-to-chip packet transfer needs. It is scalable in bandwidth and has options to optimize the interface towards specific requirements as, for example, low latency burst transfers, unidirectional transfers, etc.

In order to facilitate interoperability between devices from different vendors, the Interlaken Alliance has defined a set of recommended baseline configurations. These recommendations target typical applications at data transfer rates of 10Gb/s, 20Gb/s, 40Gb/s and 100Gb/s.

2 Interoperability Recommendations

2.1 Definitions of Interoperability Parameters

The parameters specified in the next sections are defined in the table below.

Property	Definition	Comments
Number of lanes	One lane means one differential transmit signal pair and one differential receive pair.	
Lane bit rate	Transceiver bit rate. All transceivers in a logical interface are frequency-locked and run at the same bit rate.	6.25Gb/s and 3.125Gb/s were selected to match common industry rates.
Backpressure method	Method to signal flow control on a specific logical channel or for the interface link as a whole.	Backpressure signals can either use separate pins, out of band, or be carried in bits in the data path control word, in band.
Packet transfer method	Packets can either be transferred one full packet at a time or as segments, where partial packets on different channels are interleaved.	The two modes are called packet mode and segment mode.
Stop boundary	Where a packet transfer stops as a response to backpressure.	Transmission can either stop at packet boundary, which require larger buffers, or stop at any burst control word within a packet.
BurstMax / BurstMin / BurstShort	<i>BurstMax</i> – maximum size of a data burst <i>BurstMin</i> – smallest size of an end-of-packet burst <i>BurstShort</i> – minimum interval between burst control words	
MetaFrameLength	The quantity of data sent on each lane including one Synchronization Word, one Scrambler State Word, one Diagnostic Word, one or more Skip Words, and the data payload	
Multiple use field	Field is part of the burst control word as defined in the Interlaken protocol specification.	Typical uses of this field is to extend the channel ID field or to extend the flow control field.
Rate matching	Granularity of interface rate shaper.	This shaper prevents the transmitter from overflowing the receiver.
Comments	Additional comments and observations outside the interoperability recommendation.	

2.2 Recommendations for All Transfer Rates

Property	Recommendation
Backpressure method	In-band
Channel count	Not specified, application dependent
Packet transfer method	Not specified, application dependent
Packet Mode Stop Boundary	For link level backpressure: Burst end For channel backpressure: Packet end
Burst Mode Stop Boundary	Burst
BurstMax / BurstMin / BurstShort	256 bytes / 64 bytes / 32 bytes
MetaFrameLength	2,048 words
Multiple use field	Not used
Rate matching	Yes, 1Gb/s steps
Status Messaging	Not required
Comments	For unidirectional data paths, out-of-band backpressure may be useful. LVCMOS electrical levels are then preferred.

2.3 10Gb/s Packet Transfers

2.3.1 Target Applications

The recommendations were created to provide sufficient performance for typical implementations of these applications:

Application	Frame Sizes
1 port 10 Gigabit Ethernet	64 bytes and up
12 ports Gigabit Ethernet	64 bytes and up
OC192 / STM64 POS framer	40 bytes and up

2.3.2 Recommendations

There are two different recommendations at the 10Gb/s transfer rate to take advantage of widely used serial transceiver rates. For interoperability, an implementation would need to specify if it adheres to the narrow or wide interface option.

2.3.2.1 Recommendation #1 – Narrow Interface Option

Property	Recommendation
Number of lanes	3
Lane bit rate	6.25Gb/s
Comments	10GE can be optimized into just 2 lanes

2.3.2.2 Recommendation #2 – Wide Interface Option

Property	Recommendation
Number of lanes	5
Lane bit rate	3.125Gb/s
Comments	

2.4 20Gb/s Packet Transfers

2.4.1 Target Applications

The recommendations were created to provide sufficient performance for typical implementations of these applications:

Application	Frame Sizes
2 ports 10 Gigabit Ethernet	64 bytes and up
24 ports Gigabit Ethernet	64 bytes and up
2x OC192 POS framer	40 bytes and up

2.4.2 Recommendations

Property	Recommendation
Number of lanes	5
Lane bit rate	6.25Gb/s
Comments	

2.5 40Gb/s Packet Transfers

2.5.1 Target Applications

The recommendations were created to provide sufficient performance for typical implementations of these applications:

Application	Frame Sizes
4 ports 10 Gigabit Ethernet	64 bytes and up
48 ports Gigabit Ethernet	64 bytes and up
OC768 / STM256 POS framer	40 bytes and up
4x OC192 POS framer	40 bytes and up

2.5.2 Recommendations

Property	Recommendation
Number of lanes	10
Lane bit rate	6.25Gb/s

2.6 100Gb/s Packet Transfers

2.6.1 Target Applications

The recommendations were created to provide sufficient performance for typical implementations of these applications:

Application	Frame Sizes
10 ports 10 Gigabit Ethernet	64 bytes and up
96 ports Gigabit Ethernet	64 bytes and up
2x OC768 POS framer	40 bytes and up
8x OC192 POS framer	40 bytes and up

2.6.2 Recommendations

Property	Recommendation
Number of lanes	20
Lane bit rate	6.25Gb/s

2.7 Multirate Interoperability

The per-rate recommendations are for interoperability between components of the same capacity; e.g. a 40Gb/s framer connected to a 40Gb/s packet processor. Additionally, there is also a possibility to interoperate with multiple lower-capacity components if the lower speed recommendations are also implemented.

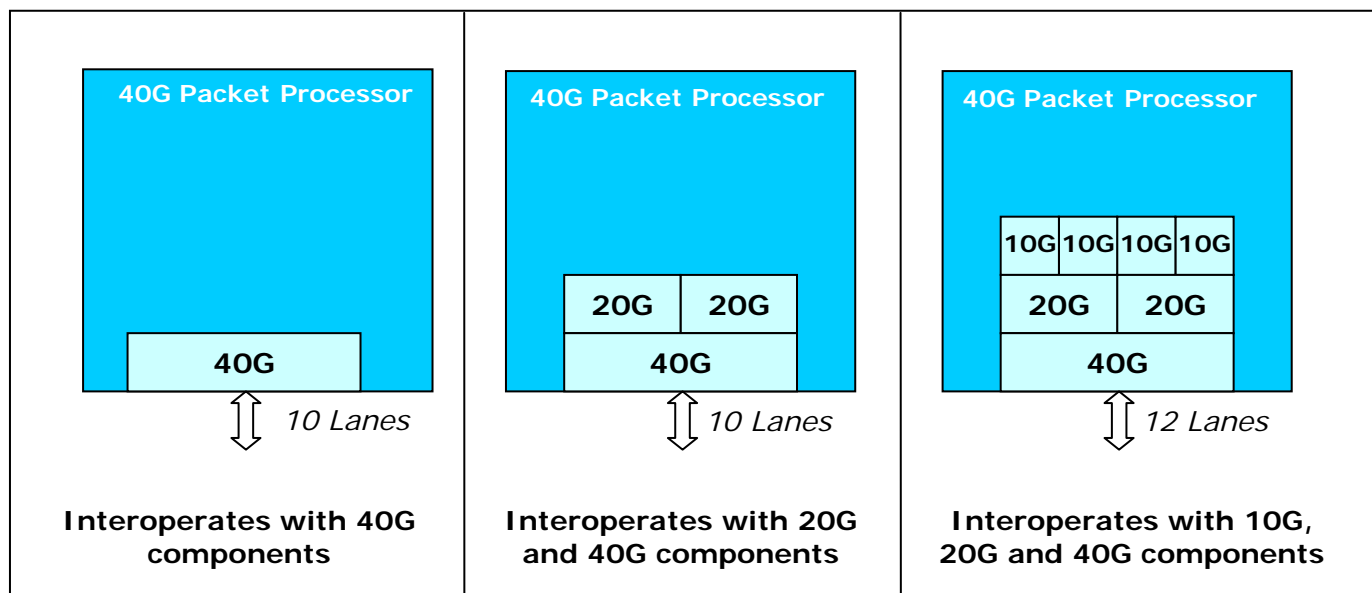


Figure 1: Example of interoperability with lower capacity components