

Fido Software Performance Characteristics

The goal of this document is to demonstrate the Fido software performance characteristics. As the document also compares the Fido older 1.3.3.131 version with the newer 1.8.6.2 one, it also shows the progress achieved in the development of Fido tracing system.

Test 1

Description of performed tests

Computer: laptop with 2.2GHz Intel ® Core™ 2 Duo Processor T7500 and 3.0 GB RAM.

Phones: replaced by a simulator generating STP version 1 packages (read /1/).

Number of phones: one or two. In the last case the Fido boxes were connected into the timestamp synchronization circuit.

Input data: the phone(s) sent trace messages containing 44 significant bytes. Each message was transported by the following STP package sequence:

Trace message #1				
MASTER	C8	D32	...	D32TS

Fido output data: 64-byte PhoNet messages or 59-byte OST messages. The payload (i.e. phone sent data) was 44 bytes.

Application receiving the output data: a simple testing application program using the loopback TCP connection. Received data was discarded¹.

Test results

Max Speed [MB/s]						
	Fido SW version	Phone 1 speed	Phone 2 speed	USB speed	Fido output / Application input speed	CPU Load [%]
One phone	1.3.3.131 PhoNet	43,2		39,2	52,2	12..21
	1.3.3.131 OST	44,2		39,4	48,3	11..18
	1.8.6.2 PhoNet	44,1		39,9	53,1	11..14
	1.8.6.2 OST	44,2		39,8	49	10..13
Two phones	1.3.3.131 PhoNet	45,1	45,1	81,2	108,3	24..34
	1.3.3.131 OST	45,1	45,1	81,2	100,0	24..34
	1.8.6.2 PhoNet	45,1	45,1	81,5	108,7	23..34
	1.8.6.2 OST	45,1	45,1	81,3	100,2	24..34

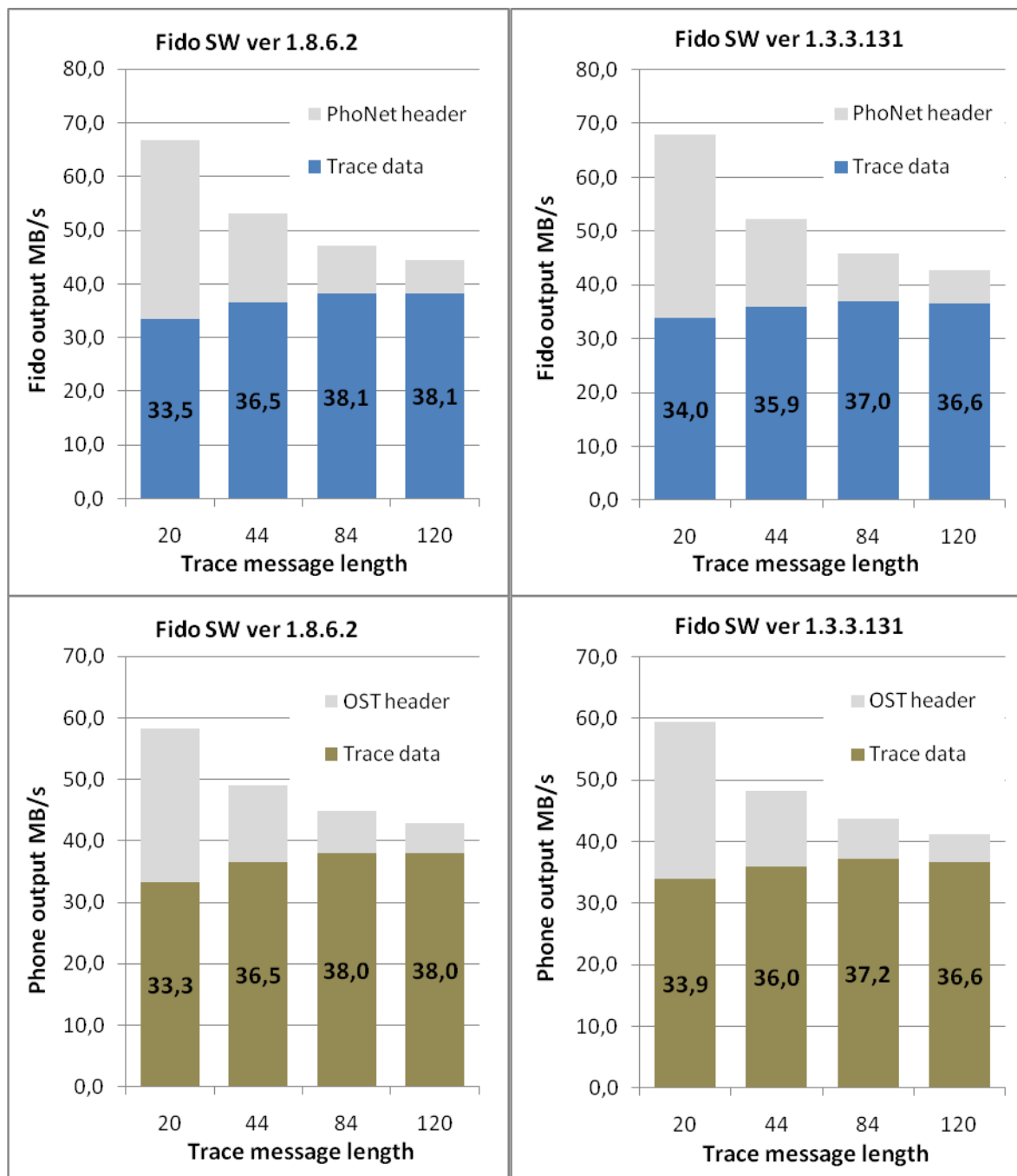
¹ Naturally, if the application receiving Fido output data has to process and/or store them, the speed characteristics may worsen.

Test 2

Description of performed tests

In this test the influence of trace messages length to Fido speed characteristics was examined. For that, trace messages containing 20, 44, 84 or 120 significant bytes were used. The STP package sequences transporting the trace messages were organized in the same way as in Test 1 (see above).

Test results



Comments:

1. To understand the diagrams, remember that Fido converts the trace messages into PhoNet or OST messages. Thus, if the phone trace message contains 20 significant bytes then the length of corresponding Fido outputted PhoNet message is 40 bytes (20 bytes of header and 20 bytes of trace data).
2. The actual max speed reachable on USB 2.0 devices is about 40MB/s. Fido box sends data to PC with speed close to this limit (see the payload part that's about 33...38MB/s). Thus, Fido performance characteristics are not far from the possible maximum. The higher speed in case of smaller payload is to some extent misleading – a large part of output is the auxiliary data attached by Fido PC software.
3. If the trace data is transported with shorter trace messages, the performance declines a bit. The reason is that each trace message sent from Fido box to the Fido PC software includes its own surplus header.
4. Although the length of PhoNet header is 20 bytes and the length of OST header is 15 bytes, the payload speed characteristics, considering also the measurement errors, are almost identical.

Test 3

Description of performed tests

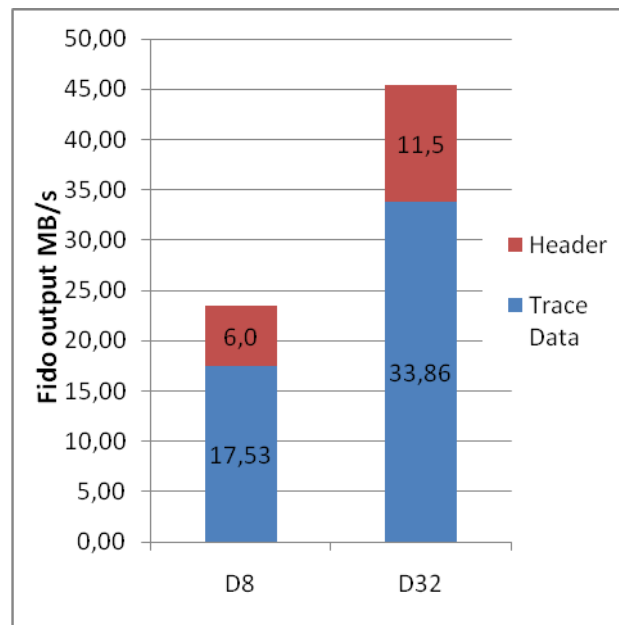
In this test the Fido box received interleaved messages from two masters sending trace messages simultaneously. As above, each trace message contained 44 bytes of significant data.

Trace message from master #1 and channel #3 starts			Trace message from master #2 and channel #4 starts			Trace message from master #1 continues...		
MASTER #1	C8 #3	Dnn	MASTER #2	C8 #4	Dnn	MASTER #1	C8 #3	Dnn

The speed characteristics were measured twice – on one occasion the data was transported with D8 packets and on the other with D32 packets.

The goal of this test was to examine the Fido performance in the most disadvantageous situation – in the input data stream the master of each packet differs from the master of previous packet. In real life several masters may send messages simultaneously but such an extreme situation is very improbable.

Test results



Comments:

Comparing the results with the results of Test 2, we can see that the speed characteristics in the disadvantageous for Fido situations are actually as good as for those in typical situations. However, they can be also much worse. The key question here is what is the length of STP packages the phone uses for data transport.

References

1. Fido Data Processing Reference. The PDF-version is downloadable from <http://www.liewenthal.ee/projects/fido/documents>