

## Article

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# Diagnosing Framing Errors

Framing refers to the characters that mark the start and end of an HL7 message (or other types of framed messages). Most HL7 services and operations have a Framing setting that allows the user to define this framing. The most common choices are available as defaults, but with the AsciiMM/NN setting, components can be configured to recognize any framing characters.

The most common framing error is ErrEndBlock. Other typical errors include a warning saying "Discarding received non-HL7 data", a warning saying "Returning unused unexpected n-char segment", and "Discarding leftover input".

These errors will usually report what character was expected and which character was missing or unexpected. For non-printing characters, it will report these using a mapping to printing characters as in the following table:

Character	ASCII(Dec)	Hex	Description
1	1 01		Start of Heading (SOH)
2	2 02		Start of Text (STX)
t	9 09		Tab (TAB)
l	10 0A		Line Feed (LF)
s	11 0B		Vertical Tab (VT)
r	13 0D		Carriage Return (CR)
e	28 1C		File Separator (FS)

Below are some sample errors and warnings you might see in the Ensemble event log that are related to framing. If any image is too small to read, right click it and open it in another tab to see the full size version. Any ASCII values mentioned below will be in decimal format.

## Sample 1:

Warning	102	2014-12-09 12:00:21.841	7872	HL7TCPSvc	Discarding leftover input "
Error	101	2014-12-09 12:00:21.841	7872	HL7TCPSvc	ERROR -<EnSDIHL7>ErrEndBlock: Received unexpected EndBlock 'er' in input "er", expected ', on [TCP]51515'
Warning	100	2014-12-09 12:00:21.841	7872	HL7TCPSvc	Returning unused unexpected 1-char segment 'e' interpreted as End-of-Message for current message
Warning	99	2014-12-09 12:00:21.831	7872	HL7TCPSvc	Discarding received non-HL7 data(1) 's'

The "Discarding received non-HL7 data(1)..." warning means that the component received an ASCII 11 before the message but it wasn't expecting an ASCII 11. The error means that the component received ASCII 28, ASCII 13 after the message, but wasn't expecting those either. What is being sent is known as MLLP framing (11 before message, 28,13 after message) but the component is set to use Framing "None". To fix this problem, framing needs to be changed to MLLP.

## Sample 2:

Warning	262	2014-12-12 11:11:13.005	6524	HL7TCPSvc	Discarding leftover input "
Error	261	2014-12-12 11:11:12.945	6524	HL7TCPSvc	ERROR -<EnSDIHL7>ErrEndBlock: Received unexpected EndBlock 'er' in input "er", expected ', on [TCP]51515, data received ="
Warning	260	2014-12-12 11:11:12.945	6524	HL7TCPSvc	Discarding received non-HL7 data(644) 'EVN A01 199601061000 199601101400 1 PID  999473857 G GENHOSP 253763 MASSIE JAMES A  19560129 M  171 ZOBBERLEIN Y ISHPEMING MP 49849   900 485-5344 900 485-5344 ENGLISH S C 10
Warning	259	2014-12-12 11:11:07.931	6524	HL7TCPSvc	Discarding received non-HL7 data(68) 'MSH ^~&R REGADT MCM FENG  199601061253  ADT^A01 000001 P 2.3.1 1 J '

The previous sample had 1 character get discarded. In this sample, we see a whole message get discarded in the first two warnings, followed by a read timeout error. When a TCP Service discards what looks like a perfectly valid message, this typically means that the start block characters were missing. The service is discarding all of the characters that weren't a start block. We don't see any characters from the table just before the MSH| segment in the first "Discarded..." warning, so this leads us to believe that there is no start block. Looking at the end of the

second warning, we see an r for the segment terminator and nothing after that before we get the read timeout error. So there is no end block being sent either. So this is a case of the service expecting leading and trailing framing characters but not getting any of them. The solution is to change the framing setting to "None"

## Sample 3:

Error	279	2014-12-12 14:02:16.782	8308	HL7TCPSPvc	ERROR <EnsEDIHL7>ErrEndBlock: Received unexpected EndBlock " in input "", expected 'l, on [TCP]51515'
Warning	278	2014-12-12 14:02:16.742	8308	HL7TCPSPvc	Returning unused unexpected 0-char segment " interpreted as End-of-Message for current message

Here we see an ErrEndBlock error and it fully explains the problem. We got an end block of " but we expected 'l', which is ASCII 10. This means that the chosen framing expects an endblock but isn't receiving one. The fix is to use a framing that doesn't expect an end block. This could mean that the framing was set to 'AsciiLF' but it should be set to 'None'. It could also mean that both a start block and end block were expected, but only the start block was sent. Ensemble doesn't support having only a start block.

## Sample 4:

Warning	375	2015-01-09 17:59:34.605	7560	HL7TCPSPvc	Discarding leftover input "
Error	374	2015-01-09 17:59:34.605	7560	HL7TCPSPvc	ERROR <EnsEDIHL7>ErrEndBlock: Received unexpected EndBlock 'r' in input "r", expected 'l, on [TCP]51515'
Warning	373	2015-01-09 17:59:34.602	7560	HL7TCPSPvc	Returning unused unexpected 0-char segment " interpreted as End-of-Message for current message

Here we see another ErrEndBlock error that fully explains the problem. We got an end block of 'r' (ASCII 13, carriage return) but we expected an end block of 'l' (ASCII 10, new line). Again, this could mean framing was set to AsciiLF when it should be AsciiCR, or it could mean that the framing is set to something like Ascii11/13 when it should be set to Ascii11/10.

## Sample 5:

Warning	338	2015-01-09 17:44:46.122	7624	HL7TCPSPvc	Discarding leftover input "
Error	337	2015-01-09 17:44:46.121	7624	HL7TCPSPvc	ERROR <EnsEDIHL7>ErrEndBlock: Received unexpected EndBlock 'r' in input "r", expected 'l, on [TCP]51515'
Warning	336	2015-01-09 17:44:46.118	7624	HL7TCPSPvc	Badly formed segment name 'WEIGHT' in message at [TCP]51515 Document# 1, level 1, segment 10, @Line 10 (WEIGHT)[62](kg)

In this sample, the ErrEndBlock error is misleading. The real problem is described in the first warning: "Badly formed segment name 'WEIGHT'". The most probable cause for this error is that the data contains a segment terminator. In this case, the OBX segment had a CR just before the word WEIGHT and so ensemble thought that that CR was the end of the segment and that the word WEIGHT was the start of the next segment. Carriage returns are not allowed within HL7 data. The solution to this problem is to get the upstream system to either properly escape invalid characters (CR is escaped as `\X0D`) or Base-64 encode the data. There is no solution to this problem that can be implemented on the Ensemble side - the upstream system must correct their data.

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