

## Summary of Second Public Review Comments & Resolutions

### BSR E1.59, Entertainment Technology -- Object Transform Protocol (OTP)

**Referenced document:** BSR E1.59, Entertainment Technology--Object Transform Protocol (OTP) [document number CP/2018-1034r1]

**ANSI public review period:** 17 May through 1 July 2019

**Question:** Do you recommend that the standards committee accept BSR E1.59, Entertainment Technology--Object Transform Protocol (OTP) [document number CP/2018-1034r1], as an American National Standard, that its requirements are not too lax, too onerous, or too vague, nor that it would unreasonably negatively impact materially affected parties in the entertainment industry? Please indicate "Yes" (accept it), "Yes with comments," or "No with reasons" (don't accept it).

Name	Representing	Yes	Yes with comments	No with reasons	Comments only
Sam Kearney (SK)*	Electronic Theatre Controls, Inc			<b>X</b>	
Scott K. Tusing	Angry Otter Lighting, LLC	<b>X</b>			

*\*Sam Kearney's form contains comments from two ETC employees. Those from Sam Kearney are marked "SK", those from Chris Mizerak are marked "CM"*

The resolutions were approved at the Control Protocols Working Group meeting on 17 January 2020.

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
1	PR2	Kearney	true	true	Whole Document	N/A
<b>Comment</b>						
<p>I worry about the addition of E1.59 to the E1.17 (ACN) protocol suite. Despite making heavy use of ACN and sACN in our products, at ETC we currently consider ACN to be a legacy protocol and are moving away from it as we look toward the future. Using ACN provides the following drawbacks:</p> <ul style="list-style-type: none"> <li>- The name carries baggage with companies who have either tried to implement E1.17 and found it to be unnecessarily complex, or have heard stories of the former.</li> <li>- It adds another standard that needs to be read in order to fully understand the protocol.</li> <li>- It adds cruft to the protocol itself, such as the mandated-unused flags field and the length split across odd boundaries. This can and has caused developer confusion.</li> </ul> <p>E1.17 currently provides solutions to the following problems, which E1.59 would need to do on its own if it moved away from E1.17:</p> <ul style="list-style-type: none"> <li>- An IANA registered port (this is easy enough to do)</li> <li>- A framing mechanism over stream transports like TCP (not necessarily applicable to this standard as written, but if needed, existing technology can be used, see WebSockets or SLIP)</li> <li>- A method for message type and length identification (trivial to make up)</li> </ul> <p>This adds some amount of work to the standard, but I believe it's worth avoiding the drawbacks mentioned above. As we know from the discussions in the Next-Gen group, the CPWG will no longer be adding new protocols to the E1.17 suite. E1.59 can either be the last protocol of the legacy world, or the first protocol of the new world. I would rather see it be the latter.</p>						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept in Principle		Removed all references to ACN from the document. Designed new OTP PDU and layering.				
<b>Actionee</b>		<b>Discussion</b>				
Dan Murfin		TG - We need to implement simplified ACN aka OTP Layering/PDU. See previous version of document from Oct 18.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
2	PR2	Mizerak	true	true	Whole Document	N/A
<b>Comment</b>						
<p>There is a mixture of usage of "rotation" and "orientation" through the document - neither are defined, making it difficult to understand the difference between them</p>						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept		Removed orientation from main body of document. Defined rotation.				
<b>Actionee</b>		<b>Discussion</b>				
Dan Murfin		TG - Agree to standardise on rotation and define rotation				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
3	PR2	Mizerak	true	true	Whole Document	N/A
<b>Comment</b>						
<p>Consider adding a way to define a kinematic heirarchy (i.e. the ability to define point module data in relation to a parent rather than always in absolute space) as an optional piece of data. This could be as simple as each point having a field for its parent address.</p>						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept		Added Module 0x0006, containing the address of the Parent.				
<b>Actionee</b>		<b>Discussion</b>				
Dan Murfin		TG - Agree that this is useful.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
4	PR2	Mizerak	true	true	Whole Document	N/A
<b>Comment</b>						
<p>It feels like you should add size or scale just to include a full transform as you would find in almost all 3d applications. Would be useful for or objects that change size, or uses we aren't yet thinking about.</p>						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept in Principle		Document updated to add a 0x0005 Module which has XYZ scale.				
<b>Actionee</b>		<b>Discussion</b>				
Maya Nigrosh		TG - we need multiple scaling if we are going to do this. Agree that we will add a new ESTA module that carries this.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
5	PR2	Mizerak	true	true	1.2	Overview and Architecture
<b>Comment</b>						
UDP is specified as the underlying transport for all OTP messages. There is a note in section 5 that the standard could be extended for use on other transports (presumably TCP). It might be worth exploring specifying a combination of reliable and unreliable transports for different situations. For example, most video games that synchronize transformation data at a high rate will send a high frequency UDP stream with updates, but then periodically send hard sync points via guaranteed delivery. If I were designing my ideal system, I would want something similar. If I drop packets or receive them out of order, I can set a warning flag until I received a guarantee that hoist X is at a specific position.						
<b>Resolution</b>		<b>Resolution Description</b>				
Reject		This is out of scope for this version of the standard. However, the document has been updated to remove explicit references to UDP to support possible extensions in the future.				
<b>Actionee</b>		<b>Discussion</b>				
Dan Murfin		TG - If we are going to run over TCP the packet header must have a length. We must ensure we do this do allow us to add this in the future, and that it is 65535 to allow TCP full size. We need to remove all of these: "format on UDP [UDP]. " and any other references to UDP earlier in the document.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
6	PR2	Kearney	true	true	3	Definitions
<b>Comment</b>						
A definition of "Module" is needed here. Modules are referenced numerous times without being defined, and it wasn't until reaching section 16 that I understood what they were. Furthermore, "module" does not quite seem like the right name for what is being described here... "property" jumps to mind as a better word.						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept in Principle		Module has been defined in the document. The task group considers the name acceptable, but it did need defining.				
<b>Actionee</b>		<b>Discussion</b>				
Dan & Maya		TG - We need to define Module				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
7	PR2	Mizerak	true	true	4.1	Coordinate System (Normative)
<b>Comment</b>						
The fact that all 3 axes do not have uniform rotation direction and offset seems very peculiar and could be a major gotcha. I've never seen a coordinate system that is not simply defined by left- or right-handedness (for all axes).						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept		The document has been updated to use a standard Right-Handed Z-up coordinate system.				
<b>Actionee</b>		<b>Discussion</b>				
Dan Murfin		TG - We need to look closer at E1.44 system to ensure we are doing the same thing. Also review other 3D systems to				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
8	PR2	Kearney	true	true	4.2	Defining the space (Informative)
<b>Comment</b>						
Standardize spelling: "implementer" vs "implementor". It is spelled both ways within this section.						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept		Standardized on Implementor throughout document.				
<b>Actionee</b>		<b>Discussion</b>				
Maya Nigrosh		TG - Agreed				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
9	PR2	Kearney	true	true	5.4, 7.1, B1.1	Flags & Length
<b>Comment</b>						
The parenthetical clarifying the use of length feels a bit informal for standards language, suggest not using "we" here						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept in Principle		Flags & Length has now been removed from the document.				
<b>Actionee</b>		<b>Discussion</b>				
Maya Nigrosh		TG - Agreed				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
10	PR2	Mizerak	true	true	6.1.2.2	Multiple Producers
<b>Comment</b>						
"A single Producer shall not transmit multiple Points with the same address." I don't like that this is explicitly prohibited. What if you have multiple sensors monitoring position of a point, for redundancy? Suppose one fails or is occluded. You may also want to average multiple sensor readings						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept in Part		Changed text to state that this is only allowed if the duplicate Point address represents the same point on the physical				
<b>Actionee</b>		<b>Discussion</b>				
Maya Nigrosh		TG - Adding priority affects this. We need to reword to disallow unrelated points, but allow "backup" point.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
11	PR2	Kearney	true	true	6.2.1	Module Advertisement Message Structure
<b>Comment</b>						
Some advertisement requests and responses are sent by Consumers, but the field in the OTP layer is always called "Producer Name". It's unclear what should be put in this field when a Consumer sends it.						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept		Changed document to refer to "Component Name" and updated description of field.				
<b>Actionee</b>		<b>Discussion</b>				
Dan Murfin		TG - Agreed. Convert to "Component Name". Update section 6 definition.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
12	PR2	Kearney	true	true	6.2.2.2	Producers
<b>Comment</b>						
Change "must" to "shall"						
<b>Resolution</b>		<b>Resolution Description</b>				
Reject		Must is allowed and is equivalent.				
<b>Actionee</b>		<b>Discussion</b>				
		Paragraph 3				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
13	PR2	Kearney	true	true	6.3.1	Name Advertisement Message Structure
<b>Comment</b>						
The maximum number of Address Point Descriptions in a single Root Layer PDU is 34. The maximum number of pages in a folio is 255. This means the maximum number of points that can be described in a Name Advertisement response is 8670, a tiny fraction of the total number of point addresses supported by this protocol. Is this limitation intended? If so, there should be some explicit language about the limits and what a producer should do if the limit is exceeded. Transform messages probably also have protocol-induced limits that are hit before the address space is filled. If the limitation is not intended, the page fields likely need to be increased in size, or consideration made for transmitting these responses over a stream-based transport.						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept		Increased Page and Last Page fields to 16-bit. Also increased Address Point Descriptions to 35/message. This now				
<b>Actionee</b>		<b>Discussion</b>				
Dan & Maya		TG - Agree we need to allow this capability.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
14	PR2	Mizerak	true	true	7.4	Sequence Number
<b>Comment</b>						
seems like an odd range to detect out-of-sequence, especially for potentially high frequency UDP traffic. If you lose connection for just 1 second, you may blow right past this window. Why not use half the range of the full range to detect it?						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept in Principle		Sequence number changed to 32-bit field. Algorithm modified and text cleaned up.				
<b>Actionee</b>		<b>Discussion</b>				
Maya Nigrosh		TG - Agree to make it a 32-bit value, and change the text to half the range.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
15	PR2	Kearney	true	true	7.8	Options
<b>Comment</b>						
The options field appears perfectly normal to me, and thus I think this silly placeholder text should be replaced. :)						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept		Updated document to use standard text.				
<b>Actionee</b>		<b>Discussion</b>				
Dan & Maya		TG - Agree				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
16	PR2	Kearney	true	true	7.10	Producer Name
<b>Comment</b>						
Change "must" to "shall"						
<b>Resolution</b>		<b>Resolution Description</b>				
Reject		Must is allowed and is equivalent.				
<b>Actionee</b>		<b>Discussion</b>				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
17	PR2	Mizerak	true	true	13.5.1	Point Name
<b>Comment</b>						
"Producers that choose not to support this field shall fill it with 0xFF characters" - seems like a bit of a waste for low power devices, it can't just set a single byte or bit?						
<b>Resolution</b>		<b>Resolution Description</b>				
Reject		This isn't a significant issue for low power devices and other optimisations can be made. However, using 0x00 makes more sense. Document updated to reflect this.				
<b>Actionee</b>		<b>Discussion</b>				
Dan Murfin		TG - It is more sensible to use 0x00 instead of 0xFF, but not really a waste.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
18	PR2	Kearney	true	true	13.5.1	Point Name
<b>Comment</b>						
Change "must" to "shall"						
<b>Resolution</b>		<b>Resolution Description</b>				
Reject		Must is allowed and is equivalent.				
<b>Actionee</b>		<b>Discussion</b>				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
19	PR2	Kearney	true	true	15.3.2	Allocation of IPv6 Multicast Addresses
<b>Comment</b>						
The RDMnet task group decided to go with "Organization-Local" scope for LLRP IPv6 multicast messages. Not being an expert on IPv6 scopes, it's possible Site-Local is more appropriate for OTP... however, I recommend that you touch base with Jason Potterf on why Organization-Local was chosen						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept		Agreed. Document updated to use Organization 0x8 Scope.				
<b>Actionee</b>		<b>Discussion</b>				
Maya Nigrosh		TG - Maya needs to fight with Jason. Text says 0x8 whereas table says 0x5.				

Number	Review	Commenter	Response	Implemented	Section Number	Section Title
20	PR2	Kearney	true	true	16	Standard Modules
<b>Comment</b>						
Table 16-1 contains definitions for Orientation and Orientation Velocity/Acceleration, but those modules are not defined by subsequent sections.						
<b>Resolution</b>		<b>Resolution Description</b>				
Accept		Removed entries in document. These were not intended for publication.				
<b>Actionee</b>		<b>Discussion</b>				
Dan Murfin						