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ID	Project	Category	View Status	Date Submitted	Last Update
0001336	X3D	19775-1 (Abstract)	public	2021-01-14 10:13	2026-01-12 09:30
Reporter	brutzman	Assigned To	mkamburelis		
Priority	normal	Severity	feature	Reproducibility	always
Status	 assigned	Resolution	open		
Summary	0001336: 17.4.2 EnvironmentLight - Khronos glTF extension for image based lighting				
Description	Support has been requested for KhronosGroup/glTF/extensions/2.0/Vendor/EXT_lights_image_based https://github.com/KhronosGroup/glTF/tree/master/extensions/2.0/Vendor/EXT_lights_image_based which likely will get implemented as EnvironmentLight				
Additional Information	Reaction by Michalis Kamburelis: Please direct the commenter to https://github.com/michaliskambi/x3d-tests/wiki/Image-Based-Lighting-(EnvironmentLight-node) I am extremely happy about this question, because it's a good question Image-based lighting (in the form of "EnvironmentLight" node) is indeed something I planned, but ultimately didn't find the time to finalize to X3D 4.0. But I still very much want to have it. It is a feature I want to have in CGE, and as such I need X3D nodes for it anyway, and as such I will want to add it to X3D. I expect that after CGE 7.0 release (in March 2021) I will have time to sit to it more. The initial design is there already, and the initial implementation in CGE is done too. But there are still important questions for the design, and important holes in my current implementation. Indeed one of the goals is to make it compatible with https://github.com/KhronosGroup/glTF/tree/master/extensions/2.0/Vendor/EXT_lights_image_based (Feel welcome to quote my answer to the commenter, or in public.) Regards, Michalis				

Tags	V4.1	×
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 Relationships 				
related to	0001269	 resolved	brutzman	glTF physically based rendering PBR, advanced material textures and lighting 
related to	0001464	 assigned	brutzman	candidate features for X3D 4.1 

 Users monitoring this issue 	
User List	There are no users monitoring this issue.

 Activities 	
 brutzman @ 2021-01-14 10:17 administrator ~0002737 	When submitting X3D4 Committee Draft (CD) once approved by Web3D Consortium Board of Directors, informally note (outside of the CD document) that our intent is to include EnvironmentLight. This future addition will be submitted once initial definition, implementation and evaluation of examples is complete.

 **brutzman**

🕒 2021-01-14 10:18

administrator 

~0002738

Preliminary stub, not including any environment-specific fields yet:

=====
17.4.4 EnvironmentLight

<https://www.web3d.org/specifications/X3Dv4Draft/ISO-IEC19775-1v4-WD3/Part01/components/lighting.html#EnvironmentLight>

```
EnvironmentLight : X3DLightNode {  
    SFFloat [in,out] ambientIntensity 1 [0,1]  
    SFColor [in,out] color 1 1 1 [0,1]  
    SFBool [in,out] global FALSE  
    SFFloat [in,out] intensity 1 [0,?)  
    SFNode [in,out] metadata NULL [X3DMetadataObject]  
    SFBool [in,out] on TRUE  
    SFBool [in,out] shadows FALSE  
    SFFloat [in,out] shadowIntensity 1 [0,1]
```

```
# This is a preliminary placeholder, these fields and other fields are TBD  
}
```

Editors note: inclusion of this node is not guaranteed.

The EnvironmentLight node is under consideration for possible implementation in X3D4

as possible support for Khronos Image Based Lighting in

https://github.com/KhronosGroup/glTF/tree/master/extensions/2.0/Vendor/EXT_image_based

=====

 **brutzman**

🕒 2021-01-30 16:00

administrator 

~0002746

🔄 Last edited: 2021-01-30 16:01

View 2 revisions

Editors Notes describing work in progress remain fundamentally important for the next specification submission to ISO.

Initial-draft EnvironmentLight node definition checked in, combining fields from X3DOM and Castle Game Engine.

* Mantis [x3d-public] draft EnvironmentLight signature needed

http://web3d.org/pipermail/x3d-public_web3d.org/2021-January/014637.html

Recent un-archived email discussion thread appended to prior thread.

Related email thread:

* [x3d-public] Comment of X3D V4, glTF, and Lighting

http://web3d.org/pipermail/x3d-public_web3d.org/2021-January/014459.html

Further email threads can be found over the past 14 months.

 brutzman 🕒 2021-02-04 10:47 administrator  ~0002750	Reviewed draft satisfactorily, TODO add preliminary node and field descriptions.
 brutzman 🕒 2021-02-21 13:29 administrator  ~0002764	Need update to versionContent indicating all fields and contained nodes. https://www.web3d.org/specifications/X3Dv4Draft/ISO-IEC19775-1v4-CD/Part01/versionContent.html#EnvironmentLight
 brutzman 🕒 2021-02-21 13:45 administrator  ~0002765 📄 Last edited: 2021-02-22 09:05 View 2 revisions	diffuseTexture and specularTexture field type definitions of X3DEnvironmentTextureNode do not match type given elsewhere. diffuse field is confusingly named and not defined. It is important to minimize ambiguity, hopefully aligning as closely as possible to glTF to avoid misunderstandings.
 brutzman 🕒 2021-08-27 10:50 administrator  ~0002914	We agreed to remove the following paragraph for CD. "Editors NOTE This preliminary node definition indicates intent to implement Image Based Lighting (IBL) as defined by Khronos glTF specification. Current activity by X3D practitioners is focused on converged design, implementation and evaluation using the open-source Castle Game Engine and X3DOM browsers. Further improvements are expected." When ready, Michalis and Andrew please check the node signature, if possible.
 brutzman 🕒 2022-02-17 03:49 administrator  ~0003058 📄 Last edited: 2022-04-14 16:44 View 2 revisions	Are we done yet? Seems so, today asked Michalis to confirm.

brutzman 2022-05-20 08:47 administrator ~0003441 Last edited: 2022-05-21 22:11 View 3 revisions	If not on glTF 2.0 PAS process, we should defer to X3D4.1. https://www.web3d.org/specifications/X3Dv4Draft/ISO-IEC19775-1v4-CD1/Part01/components/lighting.html#EnvironmentLight Michalis confirmed deletion is appropriate. Commented out in X3D Schema DTD Tooltips and X3DUOM. Ready for deferral to X3D4.1.
brutzman 2024-06-25 01:13 administrator ~0003686 Last edited: 2026-01-12 09:30 View 3 revisions	Suggested prose in X3D 4.0 CD1: 17.4.2 EnvironmentLight Editors NOTE This preliminary node definition indicates intent to implement Image Based Lighting (IBL) as defined by Khronos glTF specification. Current activity by X3D practitioners is focused on converged design, implementation and evaluation using the open-source Castle Game Engine, X_ITE, and X3DOM X3D browsers. Further improvements are expected. <pre>EnvironmentLight : X3DLightNode { SFFloat [in,out] ambientIntensity 0 [0,1] SFCOLOR [in,out] color 1 1 1 [0,1] SFNode [in,out] diffuse NULL [X3DSingleTextureNode] # .DDS format SFNode [in,out] diffuseTexture NULL [X3DEnvironmentTextureNode] MFFloat [in,out] diffuseCoefficients [] SFBool [in,out] global FALSE SFFloat [in,out] intensity 1 [0,inf) SFNode [in,out] metadata NULL [X3DMetadataObject] SFBool [in,out] on TRUE SFRotation [in,out] rotation 0 0 1 0 [-1,1] or (-inf,inf) SFBool [in,out] shadows FALSE SFFloat [in,out] shadowIntensity 1 [0,1] SFNode [in,out] specularTexture NULL [X3DEnvironmentTextureNode] }</pre> The EnvironmentLight node supports Image Based Lighting (IBL) by specifying light-source intensity around a given location (i.e., the environment) as a cube map. EnvironmentLight defines both specular radiance and diffuse irradiance. The diffuseTexture and specularTexture fields define diffuse and specular lighting modifications, respectively. The diffuseCoefficients field provides a 3 x 9 array of float values that declares spherical harmonic coefficients for irradiance up to l=2, corresponding to glTF irradianceCoefficients field. The diffuseCoefficients field overrides the diffuseTexture field if both are provided. A description of the global field is in 17.2.1.2 Scoping of lights

brutzman 2024-06-25 01:25 administrator ~0003689	TODO * prepare draft specification prose for X3D 4.1 * share examples in X3D Examples Archives * encourage adoption by authors and tool builders
brutzman 2025-01-12 11:32 administrator ~0003759	Restored prior draft prose for 17.4.2 EnvironmentLight from original X3D 4.0 committee draft CD1 * https://github.com/Web3DConsortium/X3D/blob/master/ISO-IEC19775/ISO-IEC19775-1/ISO-IEC19775-1v4.0/ISO-IEC19775-1v4-CD1/Part01/components/lighting.html latest at * https://www.web3d.org/specifications/X3Dv4Draft/ISO-IEC19775-1v4.1-CD//Part01/components/lighting.html#EnvironmentLight
brutzman 2025-01-14 16:21 administrator ~0003760 Last edited: 2025-01-14 16:23 View 3 revisions	Is an informative reference needed to the appropriate glTF 2.0 extension that documents the functionality for this node? Is this functionality already defined in ISO glTF 2.0 PAS? Is functionality for this node expected to become part of a future glTF 2.1 PAS standard?

 mkamburelis 2025-01-14 22:03 developer  ~0003761	> Is an informative reference needed to the appropriate glTF 2.0 extension that documents the functionality for this node? I already placed the links in https://github.com/michaliskambi/x3d-tests/wiki/Image-Based-Lighting-(EnvironmentLight-node) . There are actually 2 relevant glTF extensions here, - (older) EXT_lights_image_based https://github.com/KhronosGroup/glTF/tree/main/extensions/2.0/Vendor/EXT_lights_image_based - (newer) KHR_environment_map , not finalized for a long time, but considered "the future" from what I spoke: https://github.com/KhronosGroup/glTF/pull/1956 What I plan for X3D should cover the "core" design of both extensions. > Is this functionality already defined in ISO glTF 2.0 PAS? No. Only the glTF 2.0 spec is in ISO. The glTF spec does not define any lights at all. > Is functionality for this node expected to become part of a future glTF 2.1 PAS standard? No. I don't know of a plan to incorporate lights into a future glTF standard. Lights seem fine as extensions. And for KHR_environment_map (https://github.com/KhronosGroup/glTF/pull/1956) to become standard, first it should be a real extension, i.e. this PR should pass review. It does seem it has stalled.
 brutzman 2025-01-15 08:34 administrator  ~0003762	Thanks for continuing progress. Next step for references at this point is to determine whether they can be normative, informative, or simply an editors' NOTE.

Issue History				
Date Modified	Username	Field	Change	
2021-01-14 10:13	brutzman	New Issue		
2021-01-14 10:13	brutzman	Status	new => assigned	
2021-01-14 10:13	brutzman	Assigned To	=> mkamburelis	
2021-01-14 10:13	brutzman	Tag Attached: V4.0		

Date Modified	Username	Field	Change
2021-01-14 10:14	brutzman	Additional Information Updated	View Revisions
2021-01-14 10:17	brutzman	Note Added: 0002737	
2021-01-14 10:18	brutzman	Note Added: 0002738	
2021-01-30 16:00	brutzman	Note Added: 0002746	
2021-01-30 16:01	brutzman	Note Edited: 0002746	View Revisions
2021-02-04 10:47	brutzman	Note Added: 0002750	
2021-02-21 13:29	brutzman	Note Added: 0002764	
2021-02-21 13:45	brutzman	Note Added: 0002765	
2021-02-22 09:05	brutzman	Note Edited: 0002765	View Revisions
2021-04-20 11:00	brutzman	Tag Attached: V4.0 Resolution	
2021-05-04 11:41	brutzman	Summary	EnvironmentLight - Khronos glTF extension for image based lighting => 17.4.2 EnvironmentLight - Khronos glTF extension for image based lighting
2021-08-27 10:50	brutzman	Note Added: 0002914	
2022-01-20 14:24	brutzman	Relationship added	related to 0001269
2022-02-17 03:49	brutzman	Note Added: 0003058	
2022-04-14 16:44	brutzman	Note Edited: 0003058	View Revisions
2022-05-20 08:47	brutzman	Note Added: 0003441	
2022-05-20 09:26	brutzman	Note Edited: 0003441	View Revisions
2022-05-21 22:11	brutzman	Note Edited: 0003441	View Revisions
2022-05-27 08:26	brutzman	Tag Attached: V4.1	
2022-05-27 08:27	brutzman	Tag Detached: V4.0 Resolution	
2022-05-27 08:27	brutzman	Tag Detached: V4.0	
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Date Modified	Username	Field	Change
2024-06-24 01:17	brutzman	Status	confirmed => assigned
2024-06-24 01:17	brutzman	Relationship added	related to 0001464
2024-06-25 01:13	brutzman	Note Added: 0003686	
2024-06-25 01:15	brutzman	Note Edited: 0003686	View Revisions
2024-06-25 01:25	brutzman	Note Added: 0003689	
2025-01-12 11:32	brutzman	Note Added: 0003759	
2025-01-14 16:21	brutzman	Note Added: 0003760	
2025-01-14 16:22	brutzman	Note Edited: 0003760	View Revisions
2025-01-14 16:23	brutzman	Note Edited: 0003760	View Revisions
2025-01-14 22:03	mkamburelis	Note Added: 0003761	
2025-01-15 08:34	brutzman	Note Added: 0003762	
2026-01-12 09:30	brutzman	Note Edited: 0003686	View Revisions