NV5 GEOSPATIAL powered by QUANTUM SPATIAL

Evon Silvia <esilvia@quantumspatial.com>

tuples in LAS extra bytes

6 messages

Martin Isenburg <martin.isenburg@gmail.com> Fri, Mar 26, 2021 at 6:47 AM
To: Dmitry Semyonov <dmitry@agisoft.ru>
Cc: Evon Silvia <esilvia@quantumspatial.com>

Hello Dmitry,

hope all is well with you.

just letting you know that tuples and triples have been deprecated in the LAS format's extra byte specification. I noticed some LAS file output generated by your software that is still using this. LAStools can no longer read this.

https://github.com/ASPRSorg/LAS/issues/1#issuecomment-804394307

It's more future proof to put the three normal vector coordinates into three different extra byte fields.

Regards,

Martin

PS: In the CC is the chair of the ASPRS LAS Working Group

Dmitry Semyonov <dmitry@agisoft.ru> Sat, Mar 27, 2021 at 4:44 AM
To: Martin Isenburg <martin.isenburg@gmail.com>
Cc: Evon Silvia <esilvia@quantumspatial.com>

Hello Martin,

Thank you for informing us about the issue.

I found a page in the wiki with recommended ExtraBytes definitions

https://github.com/ASPRSorg/LAS/wiki/Standard-ExtraByte-Definitions

but the point normal attribute did not get there, although it was discussed earlier:

https://github.com/ASPRSorg/LAS/issues/37#issuecomment-331638348

Is the following definition fine, or you can recommend a better alternative?

Data type	Name	Scale	Description
2 (char)	normal x	1 / 127	X surface normal
2 (char)	normal y	1 / 127	Y surface normal

2 (char)	normal z	1 / 127	Z surface normal

P.S. I read your concerns about normal re-projection

https://github.com/ASPRSorg/LAS/issues/37#issuecomment-333943330

It seems that trajectory approach you recommended may be not optimal in our case, as we store a real surface normal vector estimated at the given point, not a direction to the laser scanner. Using synthetic points to define normals will double the number of points stored in the LAS file. This seems to be not very efficient compared to 3 additional bytes to store the normal direction.

On the other hand, we don't expect that the LAS files we generate will be often re-projected in external software, as the user can specify the suitable coordinate system during export. Even if someone decides to re-project exported data, the normal vectors we store are defined relative to the local X, Y, Z axis directions of the coordinate system used. These directions usually do not change too much between different coordinate systems (with the exception of geocentric coordinate systems, but they are used not too often).

P.P.S. Another possible solution might be to always store normals in the geocentric coordinate system defined by the geodetic datum used. In this case they will not depend on the coordinate system projection at all. But there can be still some very small rotations between different geodetic datums. Please let us know if you think we should always store normals in geocentric domain.

With best regards,

Dmitry Semyonov

Agisoft

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Martin Isenburg <martin.isenburg@gmail.com> Sat, Mar 27, 2021 at 6:27 AM
To: Dmitry Semyonov <dmitry@agisoft.ru>
Cc: Evon Silvia <esilvia@quantumspatial.com>

Hello Dmitry,

Data type	Name	Scale	Description
2 (char)	normal x	1 / 127	X surface normal
2 (char)	normal y	1 / 127	Y surface normal
2 (char)	normal z	1 / 127	Z surface normal

This looks good to me.

For the surface normal reprojection there is no really good solution that is 100% safe due to the possibility of a change in CRS and I think the simple solution is best while always mentioning to the users that these surface normals may require recomputation if a large CRS change happens.

I was mainly talking about the vectors used to point towards the scanner location to store which direction the laser was hitting from. Here I think a separate trajectory file synchronized by GPS time stamps from which directions can trivially be computed are a more useful way to standardize the direction from where the laser shoots.

Regards,

Martin

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Dmitry Semyonov <dmitry@agisoft.ru> Sat, Mar 27, 2021 at 9:17 AM
To: Martin Isenburg <martin.isenburg@gmail.com>
Cc: Evon Silvia <esilvia@quantumspatial.com>

Hello Martin,

Thank you for your comments. We will include this change in Metashape 1.7.3 update planned for release in the end of April / beginning of May.

For those Metashape users who have problems with normals encoding in the current version we can recommend to switch off Save point normals option in the Export Points dialog.

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Evon Silvia <esilvia@quantumspatial.com> Mon, Mar 29, 2021 at 10:03 AM
To: Dmitry Semyonov <dmitry@agisoft.ru>
Cc: Martin Isenburg <martin.isenburg@gmail.com>

Hello Martin and Dmitry,

Thank you for following through on this issue so quickly. Your proposed solution looks like it'll work to me.

To be clear, although Martin chose to end support for tuples and triples in his LAStools software, the deprecation in the LAS 1.4 revision is exactly that - a deprecation. Technically you can continue to use it when creating LAS 1.4 files, and doing so results in valid LAS 1.4 files, but support for reading those files will be limited.

Thanks again.
Evon
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Evon Silvia | Solutions Architect | ASPRS LAS Working Group Chair

NV5 Geospatial, formerly Quantum Spatial

1100 NE Circle Blvd #126 | Corvallis, OR 97330 | D: 541-249-5818 | E: esilvia@quantumspatial.com

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Dmitry Semyonov <dmitry@agisoft.ru> Thu, Apr 1, 2021 at 12:44 AM
To: Evon Silvia <esilvia@quantumspatial.com>
Cc: Martin Isenburg <martin.isenburg@gmail.com>

Hello Evon,

Thank you for confirming proposed definition.

Compatibility of exported point clouds is clearly very important for practical use, so we would prefer to keep our export compatible with LAStools software.

Thank you once again for reporting the problem.

With best regards,

Dmitry Semyonov

Agisoft

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