FreeWRL Seminar 2020

A. CASUAL USERS
1. history
- started 1998, Lukka
- name FreeWRL short for 'free world'
- 1999 - 2010 developed further by CRC communications research centre, canada by Stewart and opensource contriutors
- 2010 - current - various opensource contributors
- started with perl, ported to C
- unix, then linux, OSX; then windows starting in 2009
2. flavor
- native desktiop console app with commandline parameters
- emphasis: conformance to web3d specifications, while fun/challenging for volunteer developers
- experimental flavor in the areas of stereovision, multitouch, geospatial, hanim
- currently maintained on windows10 win32/desktop x64 and x86 builds for windows XP, Vista, 7, 8.1, 10
- linux builds occassionally during year, OSX when system available/ 2 years ago
- in past has been built for Android 4 years ago, winRT 5 years ago, blackberry playbook, iOS 6 years ago
3. where to find
- freewrl.sf.net
-- binaries https://sourceforge.net/projects/freewrl/files/
-- about 7000 downloads / year, 600/month, 20/day for windows binaries; 1/day for OSX, linux appimage
-- included in some linux distros
4- current state of conformance
- web3d v3.3 complete http://freewrl.sourceforge.net/conformance.html
- extras - things it does beyond conformance
-- multitouch emulator
-- Nodes: LineSensor, PointSensor, GeoPlanet, GeoConvert
-- support for various stereovision modes
- version 4 - what we have so far, what's missing / not done yet:

FreeWRL web3d v4 completion as of Aug 3,, 2020
Done
* PTM
* PBR
* Material extensions
* backMaterial
* UnlitMaterial
* HAnim2 Motion
* Grouping > visible, bboxDisplay
* Geo > WM web mercator
* Shape > PointProperties
* NavigationInfo > TURNTABLE
* Viewall - perspective and ortho
* MultitouchSensor
* glTF loader - partial

V4
PBR
http://dug9.users.sourceforge.net/web3d/tests/PBR/metallic_roughness.x3dv
http://dug9.users.sourceforge.net/web3d/tests/PBR/sidedness.x3dv

MultiTouchsensor
http://dug9.users.sourceforge.net/web3d/tests/sensors/puzzle_scene.x3d
http://dug9.users.sourceforge.net/web3d/tests/sensors/DragCascade_MultiTouchSensor.x3d

HAnimMotion
http://dug9.users.sourceforge.net/web3d/tests/hanim/web3d/annexD_Play_Clip_Url.x3d

http://dug9.users.sourceforge.net/web3d/tests/hanim/web3d/annexD_Play_Clip.x3d

PTM
http://dug9.users.sourceforge.net/web3d/tests/PTM/PTM_8projectors.x3d
http://dug9.users.sourceforge.net/web3d/tests/PTM/PTM_planes_perspective.x3d
http://dug9.users.sourceforge.net/web3d/tests/PTM/PTM_planes_parallel.x3d
http://dug9.users.sourceforge.net/web3d/tests/PTM/PTM_corner.x3d

glTF
http://dug9.users.sourceforge.net/web3d/tests/gltf/inline_glb.x3d
http://dug9.users.sourceforge.net/web3d/tests/gltf/inline_gltf_separate.x3d

Shape > PointProperties
http://dug9.users.sourceforge.net/web3d/tests/points/pp_pointset.x3d
http://dug9.users.sourceforge.net/web3d/tests/points/pp_polypoint2D.x3d

children > bboxDisplay
http://dug9.users.sourceforge.net/web3d/tests/bbox/screenshot_bboxDisplay.jpg
http://dug9.users.sourceforge.net/web3d/tests/bbox/ProtoInlineBillboardAnchorShape_bboxDisplay.x3d
/V4

Extras done:
* Navigation: PAN, ZOOM, TURN - like googleEarth and cesium viewers
        http://dug9.users.sourceforge.net/web3d/tests/PAN_TURN_ZOOM_july13_fw.mp4
* Tiles (like https://cesium.com/blog/2015/08/10/introducing-3d-tiles/)
        http://dug9.users.sourceforge.net/web3d/tests/tiles/TILES_scene47.mp4
* HAnim MotionPlay, MotionClip - loads .bvh files
        http://dug9.users.sourceforge.net/web3d/tests/hanim/web3d/annexD_Play_Clip_Url.mp4

freeWRL Extras
Tiles + PAN
http://dug9.users.sourceforge.net/web3d/tests/tiles/tile_scene47.x3d
http://dug9.users.sourceforge.net/web3d/tests/tiles/tile_scene2.x3d
PAN
http://dug9.users.sourceforge.net/web3d/tests/47_PAN.x3d

/freeWRL Extras

To-Do;
* Audio / Sound
* little things - see Draft and x3d-hints
* glTF - finish
* EnvironmentLight
* HAnim (glTF sytle) vertex shader animation
* Geo - SRM, GeoTiles, Geo Nav: PAN,ZOOM,TURN, walkSurface, translucency, GeoConvert_II
* load cesium 3DTiles directly

COVID-19 Should-have-dones:
* crowd particle physics with 2m constraints (are crowds uncompressible flow at 2m?)
* aerosol particle 3D flow modeling - navier-stokes, for high precision ventilation in HVAC
-- both modeled similarly with a grid of pressures / forces, suitable for particle physics?

B. DEVELOPERS
1) how download / checkout code
https://sourceforge.net/p/freewrl/git/ci/develop/tree/
- Git develop branch (master for last release)
2) how to compile / build it / hack

http://freewrl.sourceforge.net/download.html
Windows
Linux variants
OSX
Other
- has run on Android/ARM, Blackberry Playbook, iOS
- in general linuxy operating systems
3) code structure
- 500k lines C /.h, 900k total/all
- openGL rendering API
- Perl code generator
4) What's Next for FreeWRL?
Options:
a) freeze at 4.0, join Cosmo, Flux in history
b) continue conformance stream
c) SPIR-V / vulkan / metal / dx12
d) RTR real time raytracing using vulkan extensions
      https://www.khronos.org/news/press/khronos-group-releases-vulkan-ray-tracing
      https://www.khronos.org/blog/ray-tracing-in-vulkan
d) AR/HMD
e) geospatial, machine vision, IoT