umbra

Arbitrary Amount of 3D Data, Running On Gear VR

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THE
WITCHER 3
WILD HUNT

CALL OF DUTY
GHOSTS

Deus Ex
MANKIND DIVIDED

Fallout 4

DESTINY

WHY UMBRA?

BETTER
FRAME RATES

AUTOMATES
MANUAL WORK

LARGER AND
MORE DETAILED
LEVELS

ALL PLATFORMS

Demo Overview

- Flying in 3D model of Boston (~10km area)
  - Google Earth
  - After Umbra optimizations

- Running on Samsung Galaxy S7 Edge
  - Very powerful, but clearly not enough for running the input

- Gear VR
  - Raises performance requirements

Demo Overview

▸ Runs smooth 60 fps in VR

▸ Very little aliasing
    ▸ 2x MSAA + mipmaps

▸ Bounded memory no matter camera position
    ▸ 100 MB at maximum

▸ Streams assets over network
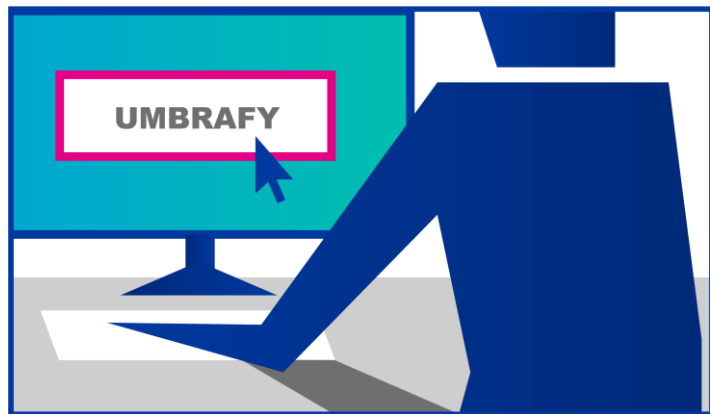   ▸ Can always fallback to lower detail, even if network is slow
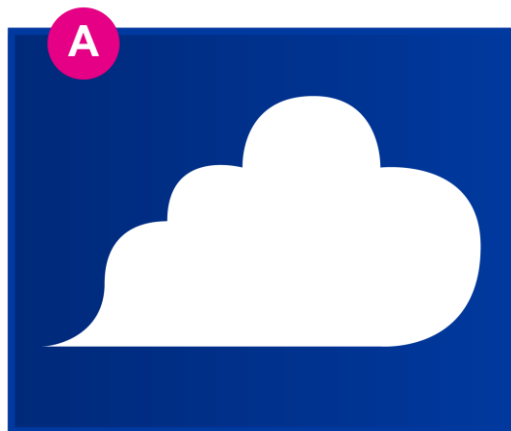
How It Works

It all starts with the user
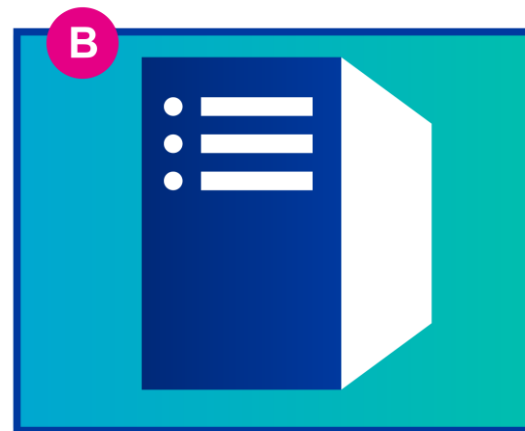(e.g. architect or game builder)
creating 3D worlds.

With their tool of choice (Unity, Unreal etc.), they can "umbrafy" these worlds.
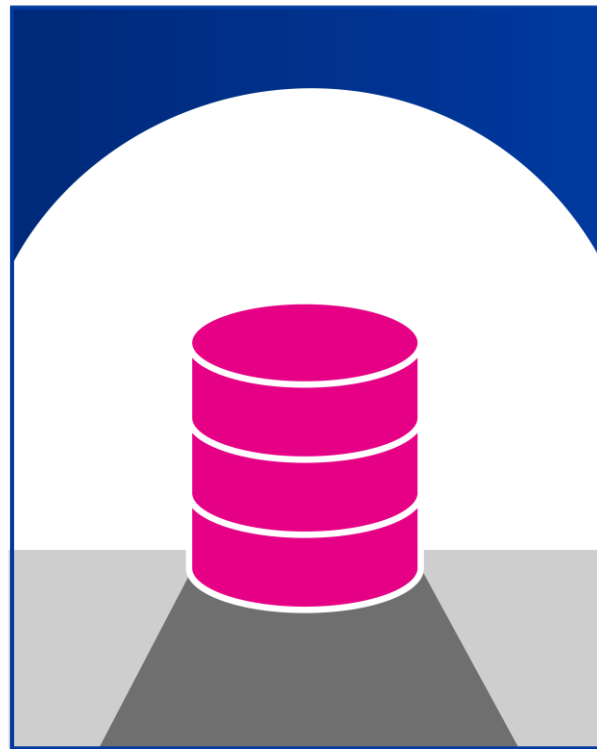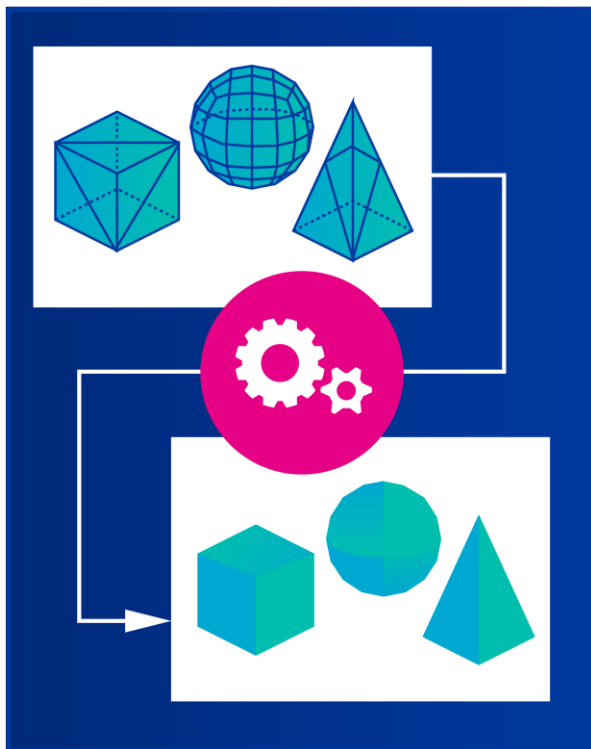
This means that they are sent to the Umbra Cloud...

...or the Umbra Optimizer on a local computer.

Umbra then automatically restructures the data...

... and creates an optimized database that is stored locally or in the Umbra Cloud.

When the application (e.g. a game, BIM or a map) is running, Umbra will...

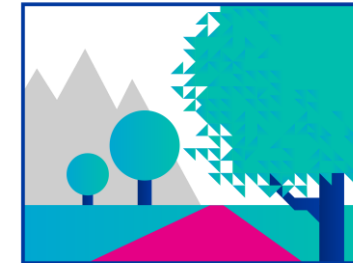**A** ...tell what to render next with 3D content streaming

B ...report what is visible with occlusion culling

C ...define which version of assets to use (level of detail)

ARM NEON – Occlusion Culling

occlusion culling

- ▸ Most expensive runtime operation
  - ▸ Rasterizes occluder models on CPU
  - ▸ Operates in low resolution, generates conservative results
  - ▸ Rasterization is embarassingly parallel in nature – process multiple pixels/elements in SIMD

- ▸ Discoveries, tips & tricks:
  http://www.slideshare.net/UmbraSoftware/gdc2014-boosting-your-arm-mobile-3d-rendering-performance-with-umbra

Conclusion

▸ Currently in closed Alpha testing

▸ Built on top of Unity
    Available as single .unitypackage file

▸ Preprocessing on Umbra Cloud

Q&A

▸ Sign up for Umbra for Unity Alpha here:
umbra3d.com/any-3d-content-any-device/