

# REAL-TIME STREAMING OF 3D ENTERPRISE APPLICATIONS TO LOW-POWERED DEVICES

A 3D rendering of the Earth, showing the Americas and parts of Europe and Africa. White lines represent orbital paths or data streams. The background is a dark, blurred image of a bookshelf.

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For new Mixed Reality and Digital Transformation scenarios, enterprises need to share digital content to their employees, customers, and partners in real-time.



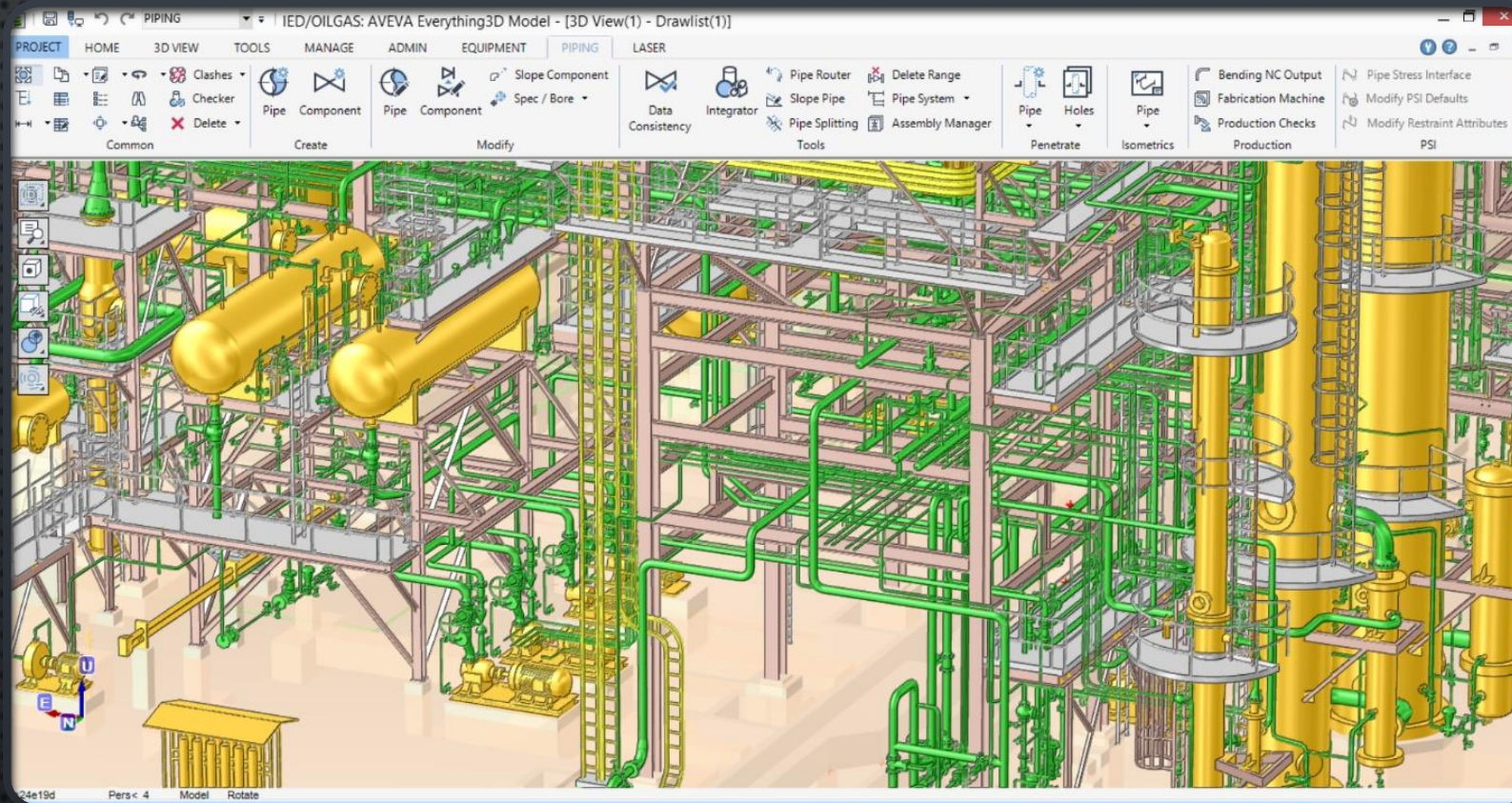


HIGH PERFORMANCE IS STILL  
THE DOMAIN OF DESKTOPS  
AND DATACENTERS





# AVEVA



- BUILT A MULTI-DISCIPLINE 3D PLANT DESIGN SOFTWARE CALLED EVERYTHING3D
- THIS SOFTWARE IS USED TO DESIGN FULL-SIZED PLANTS WITHOUT ANY LOSS OF DETAILS AND ENABLES ENGINEERS TO MAKE REAL-TIME CHANGES TO THE PLAN
- VISUALISATION OF THE RESULTING 3D DESIGN **REQUIRES POWERFUL RENDERING POWER** AND IS OUT OF REACH FOR ANY **LOW-POWERED DEVICE** LIKE SMARTPHONES, TABLETS AND HEADSETS LIKE HOLOLENS.

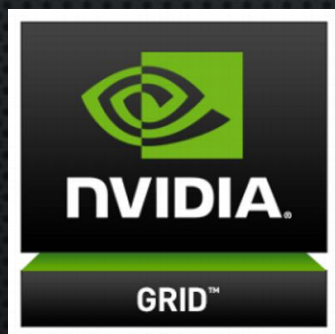
AVEVA E3D™ screenshot shown above



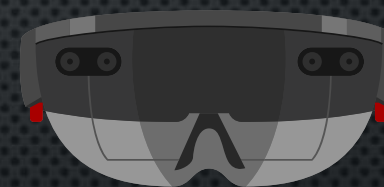
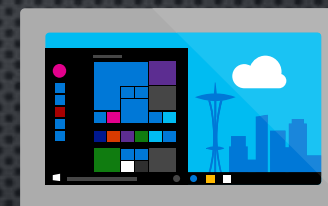
 Microsoft + AVEVA™



 Microsoft  
Azure



REAL-TIME



REAL-TIME



# WEBRTC AND NVENC TO THE RESCUE



## WEBRTC

W3C AND IETF STANDARDS

VAST SUPPORT MATRIX

ALL MODERN BROWSERS

MOBILE - IOS / ANDROID / UWP

DESKTOP - MAC / LINUX / WINDOWS

STABLE, MATURE AND OPTIMIZED



**nVIDIA®**

## NVPIPE / NVENC

SUPPORTS H264 STANDARDS

VAST SUPPORT MATRIX

NVIDIA GRID SUPPORTED ON AWS/AZURE

PRIVATE DATACENTERS

DESKTOPS & BESPOKE SOLUTIONS

HIGH PERFORMANCE, LOW LATENCY





# 3D STREAMING TOOLKIT

THE 3DSTREAMINGTOOLKIT PROJECT'S PURPOSE IS TO PROVIDE AN APPROACH FOR DEVELOPING 3D SERVER APPLICATIONS THAT STREAM FRAMES TO OTHER DEVICES OVER THE NETWORK. SPECIFICALLY:

- SERVER-SIDE PLUGIN FOR REMOTELY RENDERING AND STREAMING 3D SCENES
- CLIENT-SIDE LIBRARIES AND SAMPLES FOR RECEIVING STREAMED 3D SCENES
- LARGE-SCALE AZURE ARCHITECTURE DEPLOYMENTS
- END-TO-END FUNCTIONAL TESTS FOR OPTIMAL EXPERIENCE
- LOW-LATENCY ENCODING FOR INTERACTIVE APPLICATIONS

DEMO TIME



# UNITY + WEBRTC + NVENC + 3D

## WestUS Virtual Network

NV6 Series Windows VM  
Tesla M60 NVIDIA Card

Signaling  
Server  
Web App

WebRTC  
Server

Video Encoder  
(h264 NVENC)

3D Application  
(Unity)

TURN  
Server  
Linux VM

## DirectX Client – mono experience

Audio

Data

Video

WebRTC  
Client

X86 Windows

## Android Client – mono experience

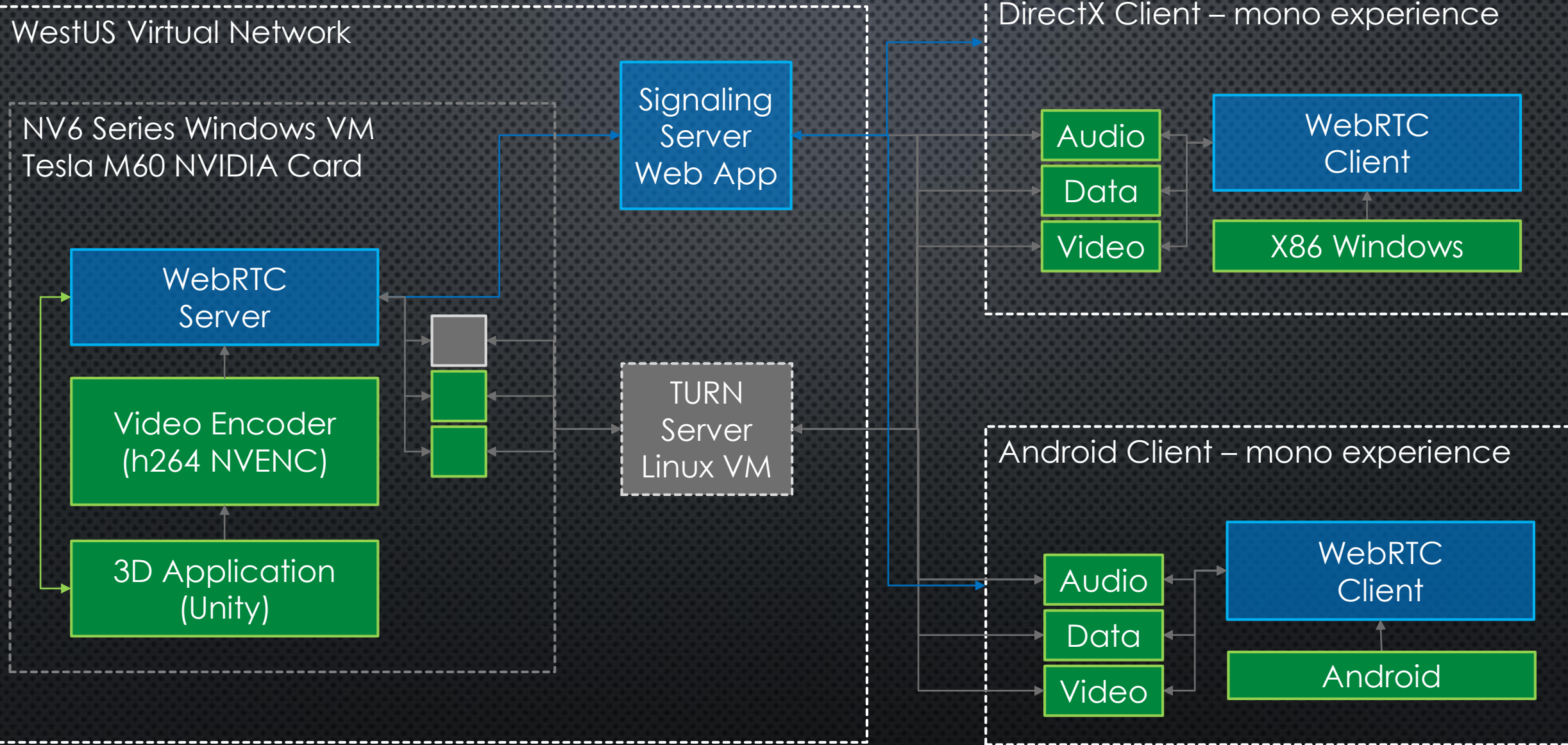
Audio

Data

Video

WebRTC  
Client

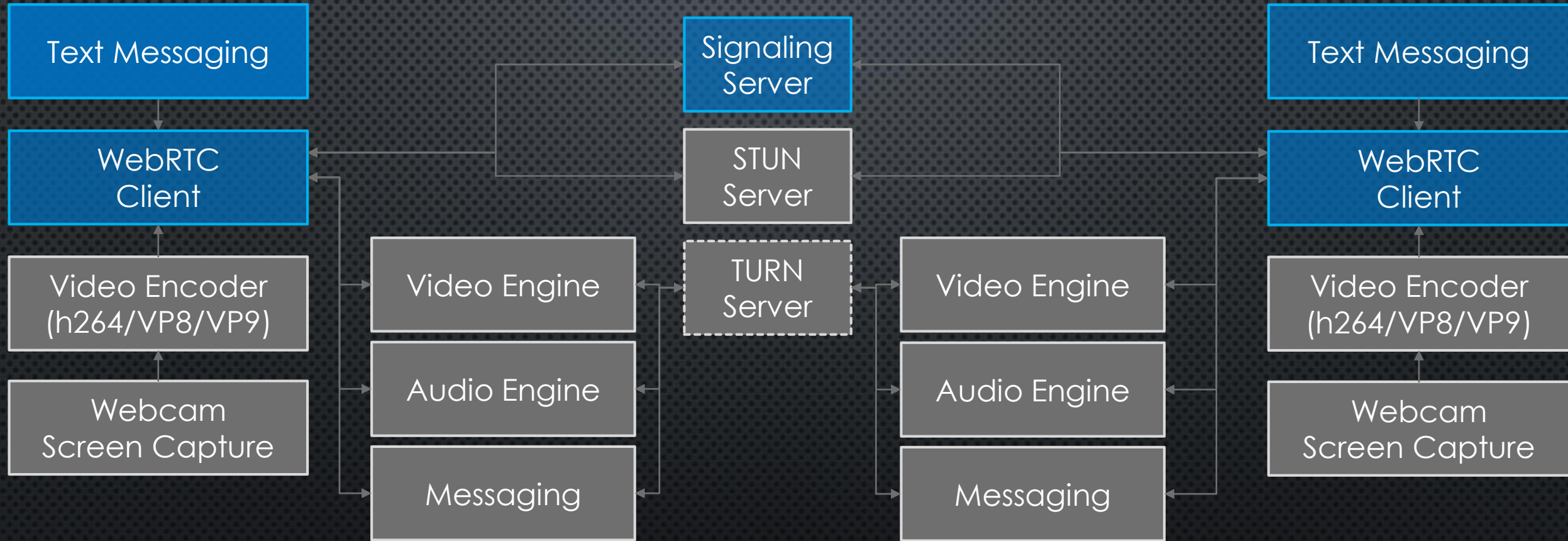
Android



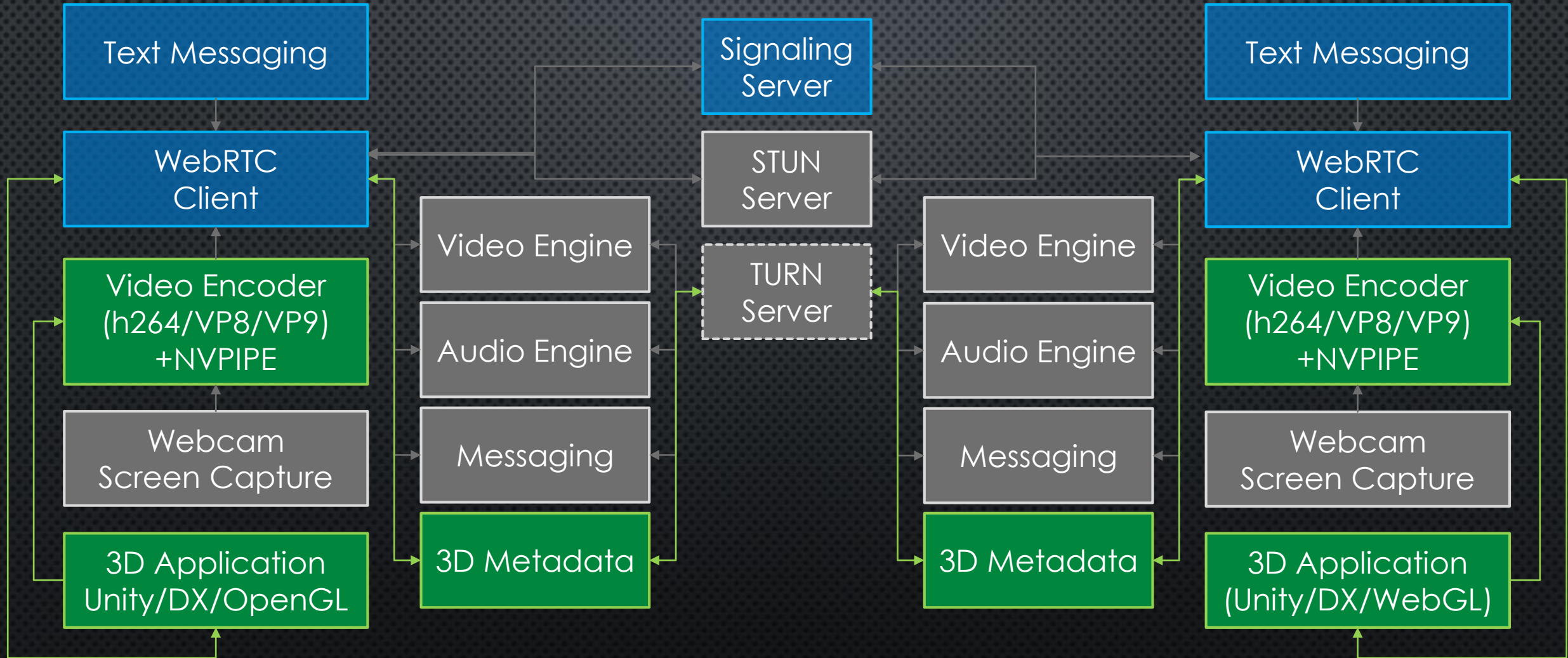
HOW IT WORKS



# WEBRTC TODAY

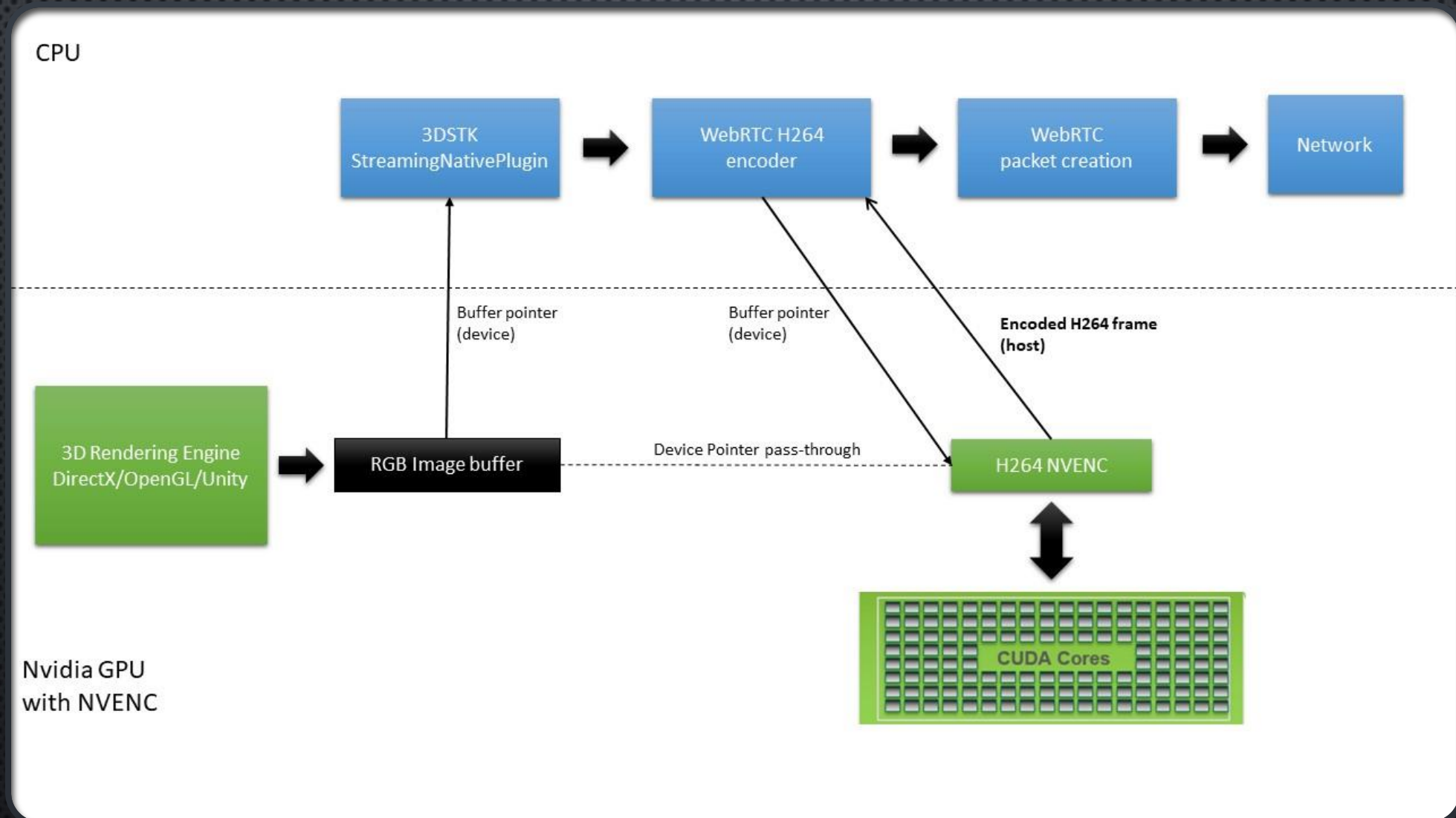


# WHAT WE BUILT – WEBRTC + NVENCODE + 3D





# SERVER-SIDE PIPELINE FOR LOW-LATENCY STREAMING



HOW TO GET IT



# WE ARE 100% OPEN-SOURCE!

- A collection of all our repos: <https://github.com/3DStreamingToolkit>
  - Main native plugin and client samples:  
<https://github.com/3DStreamingToolkit/3DStreamingToolkit>
  - WebRTC extensions (including NvPipe integration):  
<https://github.com/3DStreamingToolkit/webrtc-extensions-3dstk>
  - Main documentation site:  
<https://3dstreamingtoolkit.github.io/docs-3dstk/>

# 3D STREAMING TOOLKIT CURRENT RELEASE – V2

WebRTC NVPIPE - ZERO LATENCY VIDEO COMPRESSION LIBRARY FOR INTERACTIVE REMOTING APPLICATIONS

## WebRTC EXTENSIONS

3D DATA CHANNELS – CAMERA, INPUT, ENVIRONMENT METADATA (WIN32/UWP/UNITY)

## SERVICES

LARGE SCALE ORCHESTRATION, LOAD BALANCED CoTURN DOCKER, NODEJS SIGNALING, OAUTH IDENTITY MGMT

CONTEXT + STATE MANAGEMENT (MULTI-USER / MULTI-SESSION)

NODEJS – SIGNALING SERVER

AZURE B2C – OAUTH IDENTITY FOR GOOGLE, FACEBOOK AND EMAIL – SIGNALING & TURN RELAY

## SAMPLE APPS

UNITY – HOLOLENS CLIENT, WIN32 CLIENT

WIN32 SERVER

DIRECTX11 – HOLOLENS CLIENT, WIN32 CLIENT

WIN32 SERVER

OPENGL

WIN32 SERVER

IOS – NATIVE CLIENT, REACT NATIVE CLIENT

ANDROID – NATIVE CLIENT, REACT NATIVE CLIENT, XAMARIN CLIENT

WEB – CHROME, FIREFOX



# OUR CLOUD SERVICES

**Partners are responsible for deployment and running the infrastructure.**

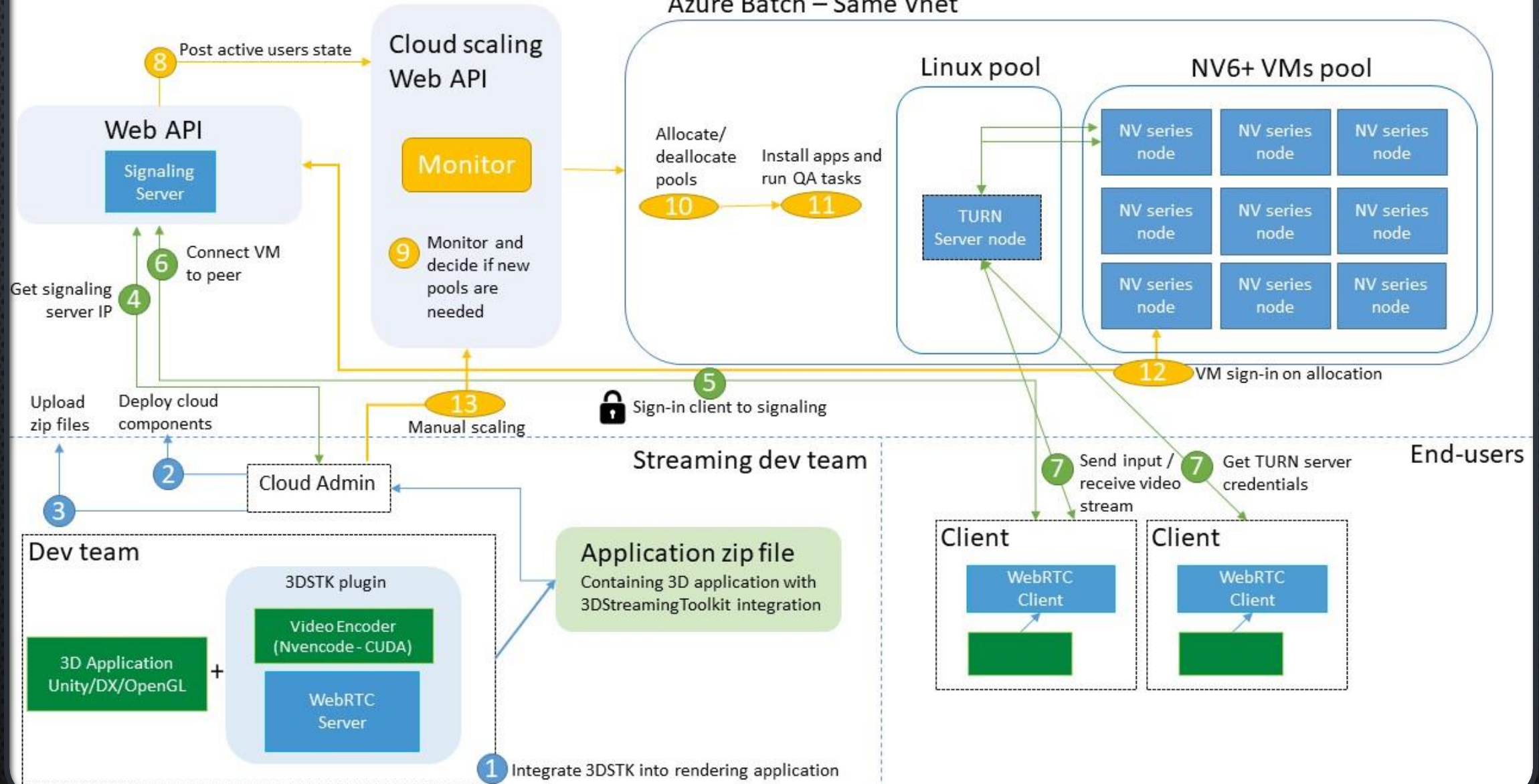
We have tutorials/samples for:

- Large scale cloud deployment <https://3dstreamingtoolkit.github.io/docs-3dstk/large-scale.html>
- Load Balanced TURN server - <https://www.microsoft.com/developerblog/2018/01/29/orchestrating-turn-servers-cloud-deployment/>
- NodeJS Signaling - <https://github.com/3DStreamingToolkit/signal-3dstk>
- Oath Identity Mgmt - <https://3dstreamingtoolkit.github.io/docs-3dstk/auth.html>

# 3D STREAMING TOOLKIT LARGE SCALE ORCHESTRATION

Azure / Same Resource Group / Same Subscription

Azure Batch – Same Vnet





# AZURE REMOTE RENDERING PREVIEW

<https://azure.microsoft.com/en-us/services/remote-rendering/>

- Accelerate decisions with mixed reality
- Experience 3D without compromise
- Easily integrate into your applications
- Cross-platform support



NEXT STEPS



# 3D STREAMING TOOLKIT

## FUTURE INDUSTRY OPPORTUNITIES

UNREAL ENGINE SUPPORT USING PIXELSTREAMING ACROSS SAMPLE CLIENTS

### SERVICES

KUBERNETES WITH NVIDIA GPU SUPPORT FOR DEPLOYMENT ORCHESTRATION

### SAMPLE APPS

MRTK WEbrtc SUPPORT:

(<https://github.com/Microsoft/MixedRealityToolkit-Unity/issues/3590>)

WEBGL + WEBVR

ARKIT / ARCORE FOR IOS AND ANDROID

LINUX CLIENT

UNREAL CLIENT

**Microsoft CSE team** works side-by-side with partners around the world to push innovation and solve complex enterprise scenarios. Reach out for potential engagements!

# Q&A

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