Petr Leontev

Solutions Architect, 3D Tech & Cloud

Contacts

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Skills

*Expertise***:** Solution Architecture, Cloud development, Realtime cloud rendering & content streaming, Event-driven architectures, Synthetic 3d data pipelines, Digital humans visualization, Geometry & texture processing, 3D tools development, Plugins & SDKs, Third-party integrations, Prototyping, Algorithms, Data structures, CPU/GPU framerate optimization, Multithreading techniques, Cross platform deployment

Tech: Typescript, Python, C/C++, React, Unreal Engine 4/5, Unity, Nvidia Omniverse, AWS EC2, Google Cloud, Alibaba Cloud, DirectX 11/12, WebGPU, VCS (Perforce, Git, Plastic), CI/CD (Jenkins CaSC, Teamcity), Windows, Linux, Docker, Terraform

Familiar: C#, SQL & NoSQL Databases, DCC tools (Houdini/Maya/Blender), fastai (Deep Learning), LLM prompting

Work experience

Solutions Architect & 3D Engineer   **Nov 2019 – Present**
at [Unreal Solutions](https://unrealsolutions.io) (Tech consulting boutique)

1) Mawari (Canada/Japan), 2023-2024: mawari.com (XR streaming for mobile devices)
I successfully completed critical to the company mission R&D projects in 3D domain that enable streaming of high-fidelity 3D content to low-power mobile devices:
- *Architected video streaming technology with Alpha support* for Android and XR devices, leveraging WebRTC video codecs and NVENC (on top of Pixel Streaming)
- *Prototyped demos for Unreal and Unity*, showcasing real-time dynamic 3D data transmission over networks for realtime rendering (digital humans)
- *Performed tradeoff analysis of NeRFs and Gaussian splatting* to enable multi-user 3d streaming
- *Architected AWS EC2 & Jenkins based CI/CD pipelines* to automate delivery and deployment processes for external XR developers to reduce burden on the core team

2) HighArc (US), 2022-2023: higharc.com (Home building cloud)
I architected offline photorealistic rendering pipeline for data-driven visualization of home interiors using Unreal Engine and the web tech. *The technology preview is accessible via web browsers* and was [showcased](https://higharc.com) at the International Builders Show 2023 in Las Vegas.
My deliverables:
- *Designed AWS-based Job system for "fire & forget" Unreal powered rendering that provides API to develop team to fire remote jobs*

- Created architecture to do distributed video rendering on top of AWS EC2 (via Thinkbox Deadline)
- Integrated Path tracing 360 rendering extension into Unreal Engine 5
- Implement v1 for shadows, reflections, translucent reflections and data extraction from path traced Unreal scene for realtime web compositing (Python image processing libs)
- Improved architecture of realtime image compositing in the web browsers to support up to 20 layers (Typescript)

3) Concurrents (US), 2020-2022: concurrents.com (Instant gaming technology)
I led efforts to enhance Cloud streaming technology for game content aka GPEG:
- improved realtime asset streaming (textures / geometry / sounds / animations / skeletal meshes)
- introduced CPU/GPU optimizations (DirectX) to achieve stable frame rates
- optimized networking via multihreading approaches (win&linux sockets)
- implemented timeslicing techniques to avoid GPU stalls and hitches
- investigated how to extend built-in virtual texturing system to stream texture data from the server
- designed "preview streaming" tool to ease debugging process in high volume content context
- added VCS automation to the pipeline (Teamcity) to increase development team iteration speed
(Unreal Engine, C++)

4) Conundrum AI (UK), 2021: conundrum.ai (Digital Twins for Industrial AI)
I architected a synthetic data pipeline on top of Unreal Engine as input data generator for ML pipeline that detects damaged razors.
(Unreal Engine, C++, Python, geometry processing, vertex shaders)

5) Evovor (China), 2020-2023: evovor.com (Toolkit for interactive presentations of Digital Humans)
I architected significant core systems (vital for company business):
- Data-driven dynamic animation blending system including facial blendshapes
- Client-server communication
- Cooking & packaging of modular content for live deployment
- Runtime image importers
(Unreal Engine, C++, API development, third-party software integration)

6) Spherical Studio (US), 2021-2022, spherical.studio (3D framework for watershed visualization in Los Angeles)
I architected Pixel Streaming pipeline for watershed visualization of LA area. Introduced multiple improvements (Google Cloud specific), established asset delivery pipeline, investigated multiview rendering in Cesium context, performed profiling and introduced optimizations to achieve stable frame rates.

7) Sber AR/VR Lab (Russia), 2021: unrealengine.com/marketplace/en-US/product/digital-avatar-service-link (Facial Animation SDK for Digital Humans)
I architected and implement v1 of Unreal SDK to create realistic face animations from audio files at runtime using AI backend as input data generator. Interaction with remote server API was a part of SDK.

(Unreal Engine, C++, API development)

Senior Unreal Engineer (3D Tools)　　　　　　**Oct 2018 ‒ Nov 2019**
at 1C Entertainment (Fulqrum Publishing)

King's Bounty 2. Contributions (Unreal Engine, C++, Python):
1) 3D Tools development: road editor (texture atlases support, World Composition integration, no Houdini required), realtime blending system for dynamic lighting, FMOD preview support, landscape utilities in open world context
2) Engine modifications: landscape tools customization, blueprint snapping support (to speed up level design workflow), occlusion culling R&D
3) Codebase adaptation to YWYU ideology to improve development workflow and decrease compilation time (by 2-2.5x)
4) Frame rate optimization using built-in CPU/GPU profiling tools to fix Garbage Collection hitches, Async Loading time and Level Streaming bottlenecks
5) Build pipeline and CI support, batch processing of game content
6) Mentoring new members of the team to increase efficiency of onboarding process

Technical lead　　　　　　　　　　　　　　**Feb 2017 ‒ Sep 2018**
at Screwdriver Entertainment (indie studio)

POSTWORLD is Hardcore Action RPG with non-linear story and possibility to replace character body parts on the fly (Steam, 2018). What I did (Unreal Engine 4, C++ & Blueprints):
1) Architecture development of gameplay systems (modular characters, modular weapons, inventory, etc.) and game flow
2) R&D of procedural terrain generation and procedural object placement to speed up level design
3) Editor extensions and plugins to speed up the level design workflow

Backend Python Developer　　　　　　　　　**Dec 2015 ‒ Jan 2017**
at Panoramik Inc.

My job responsibilities were:
1) Maintenance and support of mobile games backend: Forge of Gods and Mighty Party (Flask, Python, GAE, NoSQL + SQL Databases)
2) General improvements of the backend logic in terms of performance and scalability, with respect to time complexity, sync/async trade-off (memcache, taskqueues, cron)
3) Experimental migration from AppEngine to Appscale (independent AWS Hybrid Cloud) to significantly reduce the server costs.

Education

BSc, Applied Mathematics, Tomsk Polytechnic University (2010 ‒ 2014)
Professional development, Bioinformatics and Machine Learning (2015 ‒ 2016)
Professional development, Practical Deep Learning (2023 ‒ 2024)

Languages: English, Russian, Chinese (basic)