How *Ori and the Will of the Wisps* achieved exceptional performance on multiple platforms

Moon Studios stuns with "Xbox Game of the Year," 4k/120 fps Xbox graphics, and a 60 fps port to Nintendo Switch.

◆ unity

The challenge
To achieve unprecedented graphic performance by pushing hardware and software to the limit

Platforms
PC, Xbox One, Xbox Series X|S, Nintendo Switch

Project Staff
60

Location
Vienna, Austria

Moon Studios:
A Unity case study

How does a small team of highly talented developers and artists produce an award-winning, AAA-quality game for Xbox, then port an equally impressive version to Nintendo Switch in less than six months? Inspired by John F. Kennedy's famous "we choose to go to the moon" speech, Moon Studios has always aspired to push further and set new standards for technical and artistic excellence.

Shooting for the moon

Moon Studios's technical director Gennadiy Korol chose Unity as the studio's primary development platform when he founded Moon in 2009. "Unity is cutting edge, flexible for artists and developers, and great for prototypes and multiplatform versions," he says. But to achieve the spectacular graphics and effects in *Ori and the Will of the Wisps*, Moon had to push the platform beyond what most thought possible. To meet their ambitious technical goals and launch the game on multiple platforms, including Xbox Series X|S and Nintendo Switch, the studio relied on Unity.

"Unity's value for multiplatform development is incredible, a huge benefit. It's the difference between expanding to a new platform or not."

– Gennadiy Korol, Technical Director, Moon Studios

The results

— Achieved native 4k resolution running at 120 fps on Xbox Series X

— Reached 60 fps performance on Nintendo Switch at the highest quality, on-time

— Fit gorgeous 2D art and 3D animation into the tight memory budget for Switch

— Integrated proprietary code by leveraging Unity's high extensibility and source code access

— Won Xbox Game of the Year 2020 and topped numerous award lists[2]

[1] Golden Joystick awards
[2] DigitalTrends.com

Continuing to aim
for excellence

Ori and the Will of the Wisps, released in March 2020 for Microsoft Xbox One, in September 2020 for Nintendo Switch, and in November 2020 for Xbox Series X|S, is the metroidvania sequel to *Ori and the Blind Forest*, itself an Xbox Game of the Year winner in 2015.[3]

For *Will of the Wisps*, Moon overhauled the 2D artwork in *Blind Forest* to 3D models played on multilayered backgrounds. The game maintains narrative continuity with *Blind Forest* and introduces new melee combat.

Korol characterizes Moon Studios as having "a strong, iterative polishing process." This process has paid off, with critics unanimously praising the game for its phenomenal artistry both in graphics and in music. Gareth Coker composed the *Ori and the Will of the Wisps* soundtrack with passages performed by the 72-piece Philharmonia Orchestra, which one critic has called "a staggering achievement for fully symphonic video game scores."[4]

[3] Golden Joystick awards
[4] Soundtrack-Universe

Achieving more on multiple platforms

The *Ori* franchise is published by Microsoft Xbox Game Studios, and several years ago Moon started work on a version for the new Xbox Series X. Moon's team worked hard to perfect their rendering pipeline, graphics quality settings, audio tech, and overall performance to bring their players the highest-quality console version of *Ori and the Will of the Wisps*.

Korol says, "We wanted to show our best work on Microsoft's best work, making *Ori* the most remarkable game experience on the new Xbox." They succeeded, but it meant rethinking some of their approaches. For example, the greatest challenge was modifying the render pipeline so that the new Xbox could showcase Ori's most spectacular effects.

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– Gennadiy Korol, Technical Director, Moon Studios
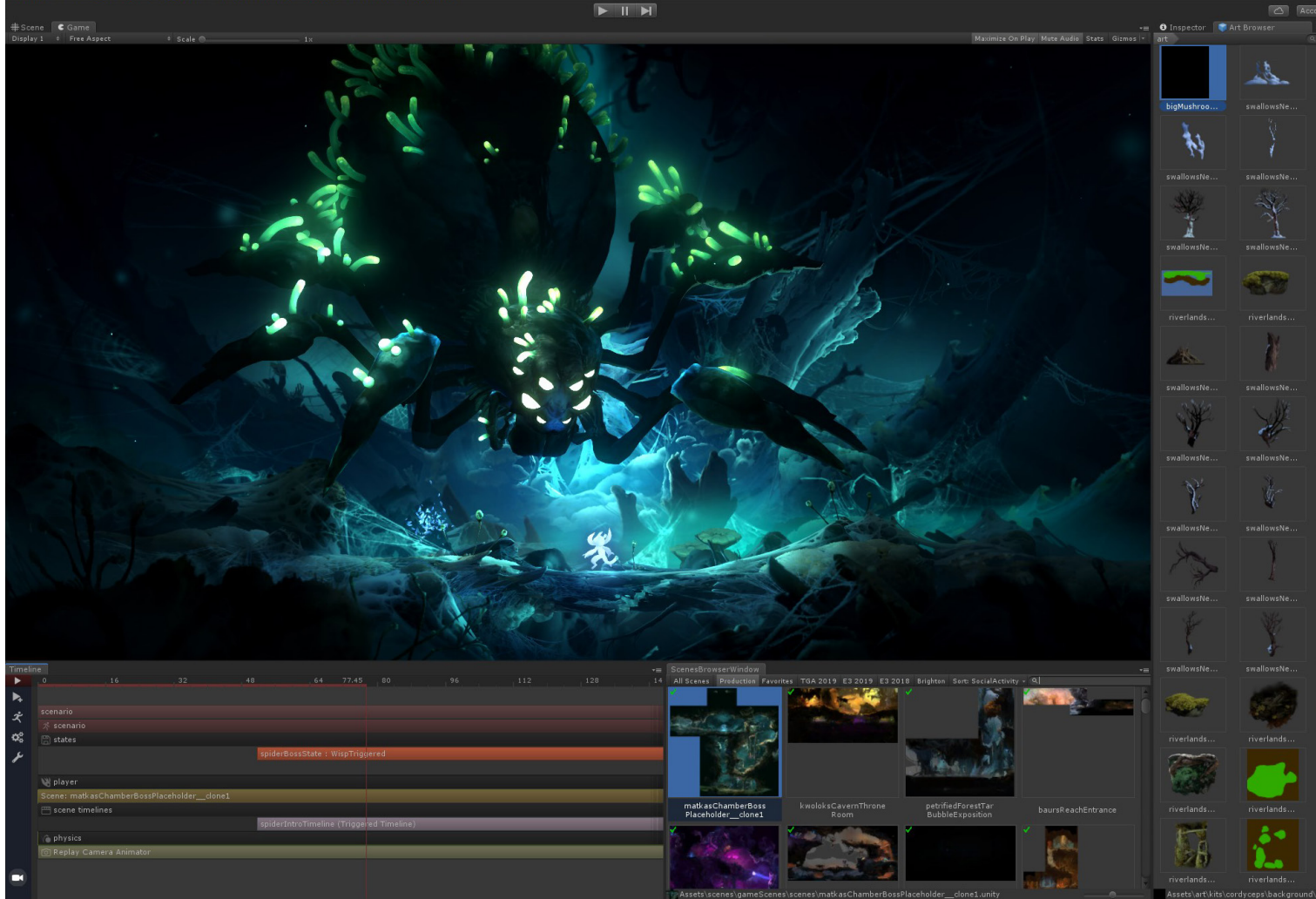
Gaining greater control over graphics

By default, Unity includes several rendering options, including the High Definition Render Pipeline (HDRP) for pushing graphics on high-end hardware and the Universal Render Pipeline (URP) which enables broad platform reach. Both are selectable options in the Unity Editor that satisfy most developers' needs. For more challenging projects, the Scriptable Render Pipeline (SRP) enables even greater control with customized C# scripting.

The complexity of what Moon wanted to do with *Ori* on the new Xbox – drawing frames at 120 fps with a six-layer parallax system – required adding proprietary code to the SRP functionality. "For us, Unity's open extensibility is invaluable. It's the only platform that lets us easily integrate our own tools. We call it Moon-ity." says Korol. "We love playing with new technologies, trying different things, and in gaming, we have to be at the cutting edge."

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Shooting for the moon
on Nintendo Switch

As part of this desire to push the envelope and bring their games to new audiences, Moon planned to launch a Nintendo Switch version from the very start of the Ori project. As much as possible, the goal was for the Switch version to equal the stellar visuals they were aiming for on the Xbox Series X version – an ambitious goal to say the least.

"We honestly didn't know if it would be technically feasible at 60 fps without a huge quality loss," says Korol. And without hitting the mark on quality, Moon wouldn't launch it.

To help tackle the port's technical challenges under mounting launch pressures, Moon and Unity Professional Services analyzed sections of code together, finding ways to tweak the particle systems and reduce memory usage. "When you're targeting 60 fps on Nintendo Switch, you have to make sure every single aspect is optimized, including simulation, streaming, rendering, and graphics," says Korol.

Pushing new limits
on performance

They also consulted with Unity source code experts and internal
R&D teams for guidance on memory allocations and other issues that
surfaced from Ori's unprecedented performance demands.

Together, they succeeded on delivering in time for the scheduled launch (two months
ahead of the Series X│S launch) and with 60 fps performance, leading one reviewer to
note "it takes the painterly, ethereal look of the original game and turns it up to 11."[5]

Korol adds, "Knowing exactly what was going on 'under the hood'
gave us better ways to analyze processes. Without Unity, we probably
wouldn't have been able to ship the Nintendo Switch version."

[5] Digital Trends

A stunning cross-platform success story

And now that *Ori and the Will of the Wisps* is reaching eager gamers everywhere on PC, Xbox One, Xbox Series X|S, and Nintendo Switch, Korol gives Unity's platform-targeting capabilities kudos for this success. "Unity's value for multiplatform development is incredible, a huge benefit. It's the difference between expanding to a new platform or not."

Finally, in summing up Moon's artistic and technical accomplishments so far, one reviewer captured the general consensus: "*Ori and the Will of the Wisps* is a masterpiece that deserves the highest praise that I can give it. Moon Studios is a shining example that a small team working with a lot of heart and passion can create something beautiful, fun, and challenging."[6] This collaboration between Moon Studios and Unity perfectly illustrates what can be achieved with vision, determination, and expertise.

[6] Josh Morgan, Xbox Addict