



Scavengers & SpatialOS

A case study

▣ SpatialOS

Case Study

Scavengers & SpatialOS

From AAA to Indie



SpatialOS is a cloud platform for building and operating any multiplayer game that integrates with any game engine.

There are a lot of things in the vast, starkly beautiful, frozen world of Midwinter's Scavengers that can kill you.

As a multiplayer co-opetition shooter with a rich PvEvP mix and survival elements, you're threatened by extreme weather, starvation, infected wildlife, mutated Scourge monstrosities, savage Outlander raiders and even opposing player teams (who may or may not be hostile).

Normally, creating an innovative game of this scale would be a big ask for a small studio of Midwinter's size - but choosing to use SpatialOS is proving a force-multiplier for their experienced team.

Platforms:
PC, consoles

Genre:
PvEvP survival
shooter

Release:
2020

Location:
Seattle

Developer:
Midwinter
Entertainment

Team size:
29

Built with:
Unreal Engine
and SpatialOS

Scavengers is Midwinter Entertainment's first title. And while the Seattle-based studio was only founded in 2016, the talent behind it has been in the games game for decades. Of the thirty staff, many worked at Halo developer 343 Industries, including CEO Josh Holmes who was 343's Studio Head and Creative Director.

Even though the team is small, Holmes is clear that they're out to make genre-redefining games:

'I appreciate what you can achieve with a massive team, but there are downsides, too,' he says. 'They can be hard to manoeuvre. Silos form. And it's impossible for any one person to feel that they're really involved in every aspect of a game. Which is why we're deliberately small - a fast, agile, tight-knit team of developers.'

Being small and agile has its restrictions, of course. Margins are finer. Resources tend to be more limited. Risk needs to be carefully, minutely managed. If you're small and you want to fight big, you need a plan - and maybe a partner, too.

That's where Improbable and SpatialOS come in.

The technological partnership

Midwinter's partnership with Improbable is mutually beneficial. Improbable gains by getting an experienced team's feedback to improve the Game Development Kit (GDK) for Unreal including reporting bugs, identifying issues and* providing test cases. Midwinter is working closely with the SpatialOS GDK teams on a day-to-day basis, telling them what works, what doesn't, what they need - and also helping work out how Improbable should deliver it. This enhances and expands the SpatialOS Game Development Kit (GDK) for Unreal.

In return, Midwinter gains by getting to make a new kind of game - the ambitious, innovative kind that we're making possible. Improbable gives them the services, tools and infrastructure they need to build a crisp, richly populated world - the kind of world that has so far been impossible.

But how does SpatialOS help, exactly?

Making multiplayer development more efficient.

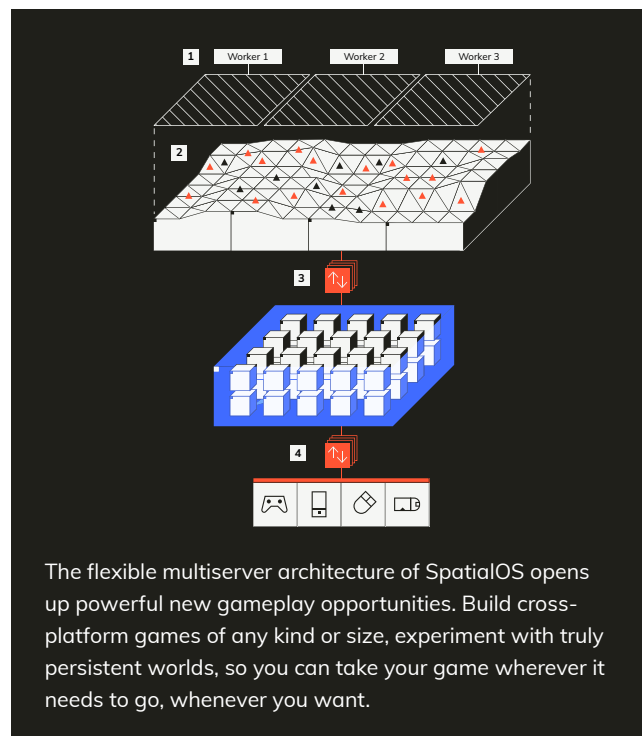
First of all, using SpatialOS means that Midwinter won't need dozens of engineers to set up and manage their game's backend. SpatialOS takes care of instance management, player identity and external database integrations as well as the networking and hosting.

"What in the past would have required a team of ten engineers," says Holmes, "you can now achieve with just two." This saves massively on costs and gives the Scavengers team more time to focus on perfecting their game's design.

Making development more effective.

Second, the GDK integration for Unreal replicates the normal Unreal development experience. Though it's currently in alpha, the GDK is designed to allow developers to stick with familiar Unreal tools and workflows, whilst enabling easy distributions and early scale-testing.

"The thing that convinced us that SpatialOS could work for us was the GDK," Holmes explains, "we could see that it'll let us work in a native Unreal way."



Allied to built-in logging, metrics and inspection tools that help analytics and debugging, this means faster iteration and a streamlined approach to finding the fun in any game, whatever the genre.

“To over-simplify things, it’s like a volume knob. You don’t need to re-architect the networking solution - you just turn the knob and increase the compute.”

– Josh Holmes, CEO Midwinter

Making multiplayer more.

Perhaps the most exciting thing about SpatialOS from Midwinter's point of view, however, is the unique multiserver architecture it will enable. SpatialOS will allow millions of players on different platforms to inhabit Midwinter's frozen, perilous game world, enabling more connected, more social experiences.

"To over-simplify things, it's like a volume knob," says Holmes. "You want to expand your player count from 40 to 80 or 800? You don't need to re-architect the networking solution - you just turn the knob and increase the compute."

Unreal is the perfect engine for building the desolate, rich world of Scavengers.



‘We wanted a map that could expand and keep players together, with teams pursuing their objectives in a shared world, with smart AI and complex systems - bleeding MMO and Action Shooter together. That’s only really possible with SpatialOS.’

– Josh Holmes, CEO Midwinter

“In Halo 5’s Warzone mode, we had a maximum player count of 24 and limits on the number of AIs, vehicles and objects we could represent before we ran up against the limits of the server’s capabilities and started impacting gameplay. We’d have to simplify the AI logic, so it wasn’t as intelligent or responsive as it would be in a campaign session.”

SpatialOS adds to this by also storing game data on an in-memory database, making that world persistent in unusual ways: actions don’t just have consequences, they have long-lasting consequences, even when you log off.

That means, it’s not just about a high player count, as Holmes explains:

“...it’s how rich we can make this world. It’s how we can scale it, expanding a single map rather than adding new ones, so you can start somewhere new every time, explore more unique locations and - if you want - interact with more players. We can add more AIs, blending PvP with PvE so more people can share this bigger world and engage in high-fidelity combat with many, many more enemies.”


New tech, new challenges.

It’s not all roses. Though anyone used to using the Unreal engine will be familiar with the tools and workflows inherent to the GDK for Unreal, multiserver multiplayer can make for design and technical challenges that are as difficult to solve as they are satisfying.

“First of all,” says Midwinter Engineer Peter Burzynski, ‘you’ve got to move from a pull model, where you make changes and inspect things directly, to a push model, where entities send messages about their respective states. You have to remember that, in a multiworker scenario, you may not be the authority on an object.

“Second, you have to consider what happens when something moves across boundaries, and when they transfer between server workers in particular. You tend to replicate the external state of an object (which way it’s facing, whether it’s firing its guns or not) but not the internal state - what’s in its ‘brain’, for example, or what group it’s part of. The new server needs to know all this.”

That’s the major challenge of multiserver development - a different design mindset.



Improbable supplies infrastructure and services that leave you free to focus on gameplay, and tools that accelerate your production process. You can test continuously, iterate faster, scale on demand, and manage your live game.

New challenges, new possibilities.

For every one of these challenges, however, more possibilities present themselves. The flexibility to change a live game at any point - its modes, its scale - quickly and easily to suit market demand is simply unprecedented.

“It’s the operational infrastructure it gives you.” Josh says, ‘Without SpatialOS, we’d have had to make certain decisions at the beginning of the development process about things like player count and AI density, and drive those stakes into the ground, knowing they couldn’t be moved at a later date. A foundation of SpatialOS will allow Scavengers to continue to evolve whilst the community is actively experiencing it.”

It’s not just Scavengers and Midwinter who stand to gain. With engine integrations for Unity and CRYENGINE and the potential for developers to integrate any engine at all, the SpatialOS infrastructure can help unlock potential across the industry, as Burzynski explains:

“SpatialOS is democratising distributed computing for games, so you don’t need vast resources to build ambitious MMOs or online games. Small studios can do stuff they couldn’t do before, and big ones can take risks they’d otherwise have to think twice about.

“It doesn’t let you do everything - you still have to make content choices - but it does expand your palette. You can do so much that wasn’t possible before. Do you want a map that changes over time? To see every tree ever cut down or every footstep ever taken? That’s all feasible.

“But the questions that excite me,’ Burzynski concludes, ‘are whether this means we’ll see whole new genres and entirely original kinds of gameplay. Perhaps we’ll be able to bring different kinds of game into the same, shared space? The promise is rich. It’s powerful. I’m excited by the journey.”

New possibilities, new worlds.

Midwinter and Improbable’s collaboration has helped both parties. It’s already given Improbable a vastly-better SpatialOS Game Development Kit for Unreal, with critical tools and workflows.

For Midwinter, it’s unleashed wider design possibilities that they’re already taking advantage of, throughout their design process. For both parties, the combination of veteran developers and cutting-edge cloud technology is only going to improve both products as time goes by.

You can find out more about Scavengers or sign up for pre-release testing at www.scavengersgame.com.

To try out the SpatialOS GDK for Unreal, visit www.improbable.io.