



## The Coalition accelerates game development with AMD Ryzen™ Threadripper™ CPUs

Fast compile and build on one system using AMD Ryzen Threadripper processors



### CUSTOMER

## THE COALITION

### INDUSTRY

Game development

### CHALLENGES

Keep developers effective while working from home

### SOLUTION

Deploy AMD Ryzen™ Threadripper™ 3970X CPU powered workstations

### RESULTS

Developers can now compile and link code quickly with a single workstation

### AMD TECHNOLOGY AT A GLANCE

AMD Ryzen™ Threadripper™ 3970X with 32 cores

AMD Ryzen™ Threadripper™ 3990X with 64 cores

### Designing and coding graphically complex games requires powerful workstation hardware, constantly pushing the limits of what is available.

The Coalition is a Microsoft-owned studio that has been developing the hugely popular and graphically outstanding Gears of War series since the Ultimate Edition, released in 2015, which remastered the original game from the ground up. The studio has since then delivered Gears of War 4 and Gears 5. Developers are constantly looking for ways to improve their iteration time, while the games grow in size and scope. This led the studio towards the AMD Ryzen™ Threadripper™ CPUs, to help manage the increasing complexity of their projects.

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*Jaysen Huculak, Lead PC Engineer at The Coalition*

were doing PC development on low clock speed Intel Xeon CPUs, and testing our changes against these slower CPUs,” says Perzel. “We were not getting an accurate view of what our CPU usage was going to look like for end users, because we were slower than the average end-user machine.”

“We had Intel Xeon machines that were able to compile all of our files in 20 minutes, but our linking phase was still taking 20 minutes,” says Perzel. This led The Coalition to turn to a network-distributed model for the compile phase, alongside the move away from traditional desktop workstation

hardware. “We turned to a network distributed build environment to solve the multiple core problems, by using other idle cores on the network.”

“We needed a lower number of very fast cores, so we started to get consumer CPUs, as consumer CPUs started to have six, eight, and even 10 fast cores,” says Vogt. “This got our link times down a lot, but it meant that we had fewer, faster cores under the desk, and more cores spread out throughout the network,” adds Perzel.

“It created a split where the affordability of a single machine with a whole lot of fast cores was impractical,” says Vogt. “The idea of putting 32 cores under a developer’s desk, or even more, was ridiculous in the Intel Xeon world. We’re not going to pay 15 or 20 thousand dollars for a pair of Intel Xeons.” Then The Coalition came across AMD Ryzen™ Threadripper™ processors, but it wasn’t initially in a workstation context.

### Conflicting needs of compile and link

“Our development is split into two parts, compile and link,” explains Mike Perzel, Rendering Lead at The Coalition. “Compile is building all of your compile objects and then linking is taking all of those compile objects and building them into one EXE. Compile wants a lot of cores, and it doesn’t care too much about the speed of those cores. Linking is a traditionally single-threaded operation. It is bound by how fast your processor is going to be under your desk. There’s no way to farm it out.”

“A high-end workstation used to be a dual Intel Xeon box,” adds Joe Vogt, IT Manager at The Coalition. “You’d get 12 or 16 cores, but still those cores weren’t going to be that quick.” This had other repercussions in the development process. “When we first started, a lot of us

## An introduction to AMD Ryzen™ Threadripper™ CPUs

“The first time we started talking about Threadripper™ was as a user,” says Perzel. “How would it run Gears 5?” Jaysen Huculak, PC Development Lead at The Coalition, tried out a 16-core AMD Ryzen Threadripper 2950X processor at home. “We were able to get Gears 5 to over 200 frames per second,” continues Perzel. “As a gaming device, it was astounding.”

However, the AMD Ryzen Threadripper CPU-based system had capabilities far beyond playing games. “It ended up quickly becoming my primary dev machine because of the combination of fast single-core performance and high thread count,” says Huculak. “I previously had to run two machines, one to represent more of what the consumer experience was with a higher clock rate and single core, and my Intel Xeon machine with a much lower clock rate, which couldn't run our benchmarks at a speed that would push the GPU to max. My ability to go from two machines down to one was a game changer. When I switched to Threadripper I stopped using my secondary machine. I'm finding that I have less overhead in moving between machines and doing things in multiple places.”

All of this changed very suddenly with the arrival of the pandemic, and all of the Developers at the Coalition moving to work from home. “Suddenly, that very fast network we had grown reliant on wasn't there,” says Perzel. “Home Internet speeds and stability were a lot more variable, and it was a big problem for some of the Developers.”

### Threadrippers to the rescue

Right around the same time as the switch to working from home, some new Threadripper workstations arrived at The Coalition. Perzel tested building on an Intel Core i9 with 10 cores against an AMD Ryzen Threadripper 3970X CPU with 32 cores, using the distributed build system. “The AMD processor was about 20 percent faster,” says Perzel. “It wasn't getting massively faster, because a lot of our build was still being distributed across the network. When I did a build without the

distributed build, however, that's where I noticed the big difference. Compared to my Intel Core i7 machine, it was 270 percent faster, and it was 205 percent faster than the Core i9. The final number that was the most interesting was that the Threadripper with no networked build was 70 percent of the speed of the Core i9 compiling in-office with the distributed build system. It was still in the 25-minute range, but now you have something that doesn't require an incredibly fast network. If those machines get moved back into the office, it will still be great, as those very fast cores will be available to the network.”

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*Joe Vogt, IT Manager at The Coalition*

“One of the things that I noticed when I was compiling locally,” adds Huculak, “was that my Threadripper system was more usable than my other machine. Before, I was often not able to task switch on my Xeon while utilizing the cores, but my Threadripper™ processor has allowed me to switch more easily.”

“A lot of our developers had additional PCs,” adds Vogt. “They would start a build on one and then work on something else on the other computer, because it would still be usable. You gain a fair amount of savings by not having to have that second machine.” This is allowing the developer team to tune their code more iteratively, too. “As a developer, it's all about the compile time,” says Perzel. “The faster we get our compile time back, the more changes we can do.”

The Coalition is also now trying the 64-core AMD Ryzen Threadripper 3990X. “One developer working from home has four machines networked together as a local build farm,” says Perzel. “We are going to try and replace that with a single 64-core machine. Having one tower that does everything is a pretty big deal for quality of life when you're working from home. Not a lot of people have room for multiple machines in their homes. If you can get one of these CPUs, you should take it!”

“Threadripper is everything you want in a processor,” concludes Vogt. “It has the speed and it has the number of cores. Before this, you always had to choose your processor based off what would be more important to you, number of cores or speed, and this processor doesn't make you have that choice.”



### About The Coalition

Founded in 2010 under the name Zipline Studios, The Coalition is a Microsoft-owned game design studio based in Vancouver, Canada. It has been developing the Gears of War series since Gears of War Ultimate, when Microsoft acquired the franchise from Epic Games. It is part of Xbox Game Studios and has subsequently developed Gears of War 4 and Gears 5. The company's name, The Coalition, is derived from an entity within Gears of War called the Coalition of Ordered Governments. The studio now employs 200 designers and developers. For more information, visit [thecoalitionstudio.com](http://thecoalitionstudio.com).

### About AMD

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