Incredibuild for Cloud

Unreal Engine Acceleration Benchmark
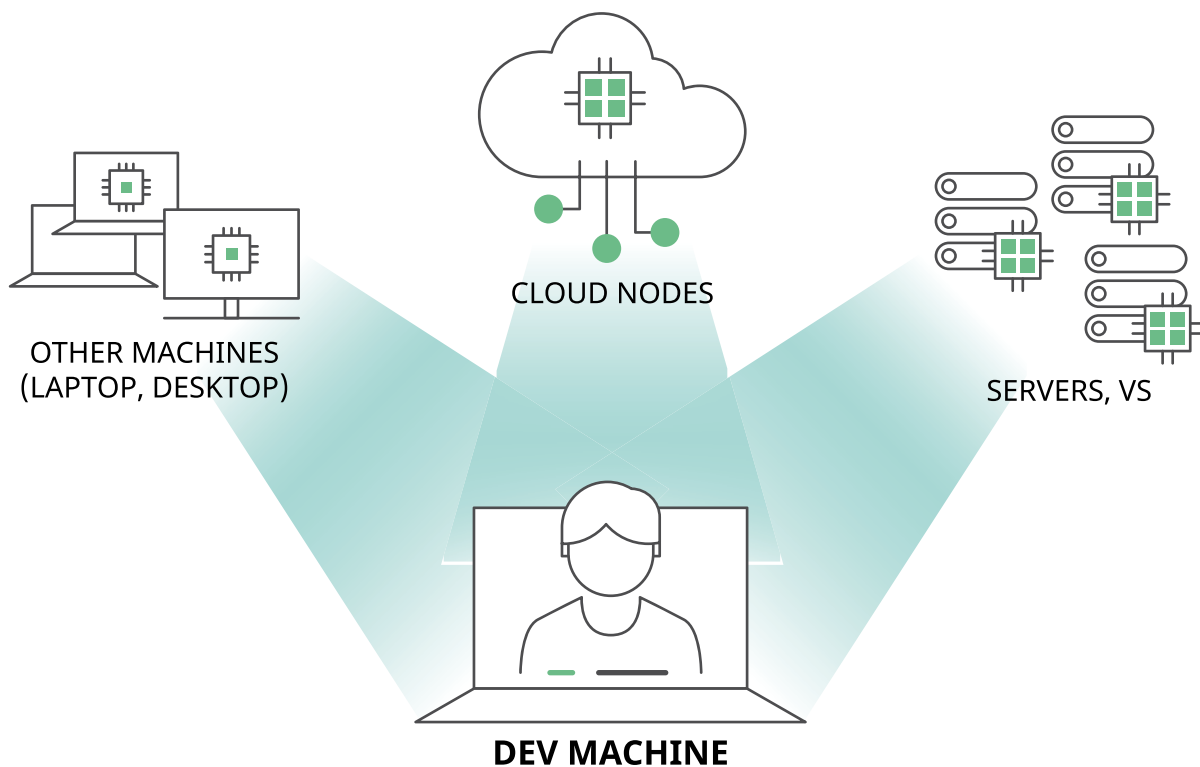
INCREDIBUILD

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Changing the cloud computing capacity/cost equation

You need cloud computing capacity when you need it.
But maintaining it when you don't, carries a hefty price tag.

You may not need a 64-core machine for every build. But when it's crunch time or when performance is of the essence - that capacity is a must-have. Incredibuild accelerates cloud-based compilation, tests, and tons of other compute-intensive workloads by seamlessly and concurrently allocating and de-allocating cloud resources (on-demand and according to your needs), while transparently emulating your local environment on remote machines. By doing this, we transform the build node into a supercomputer with hundreds of cores and gigs of memory – radically shortening compute times, optimizing performance, ensuring service availability, and actually lowering cloud costs.

How does it work?

Incredibuild Cloud distributes tasks across cloud-based Virtual Machines (VMs), without requiring the user to launch and maintain any cloud resource. Additionally, Cloud VMs are automatically launched and terminated according to the user's on-going needs.

OTHER MACHINES
(LAPTOP, DESKTOP)

CLOUD NODES

SERVERS, VS

DEV MACHINE

Upon activating Incredibuild Cloud, Incredibuild creates a set of VMs on the cloud. These VMs are then moved into 'deallocate' mode and are placed in Incredibuild pool on the cloud. When there is a need to utilize these cores, the VMs in the pool are activated according to the number of requested cores (the user is able to pre-define the number of VMs that will be included in the pool). If the need arises for additional cores, Incredibuild Cloud will launch additional VMs and will terminate them upon the completion of the task execution.

At peak times, Incredibuild will dynamically harness the power of up to thousands of automatically provisioned cloud compute instances, and de-provision these resources once the workload's execution is done, reverting to your local infrastructure. You can choose to perform all of your development in the cloud and gain ultimate scalability at all times.

Spot on!

Incredibuild manages both AWS Spot Instances and Azure Spot Instances. The nature of these instances is that they can be reallocated by the cloud provider with no notice. This could cause a massive problem if you're in the middle of a build. Incredibuild compensates for sudden capacity drops on the fly – allowing you to enjoy all the cost and availability benefits of spot instances without endangering your processing results or speed.

Benchmark Objectives

Obtain real world benchmarks imitating a developer changing code in an Unreal Engine Shader project which is connected to Github. The code change triggers an Azure DevOps pipeline to run. As game builds consists of hundreds of compilation tasks that can run in parallel, Incredibuild Cloud (IBC) will seamlessly scale the 16 cores Azure DevOps node to additional 160 Azure cores on-demand.

Results

Below are the benchmarks per scenario:

Project	Build time without IBC	Build time with IBC	Time saved	Acceleration ratio	Cost Per build (with spot enabled)
Unreal engine 4.24 Build	1:06:17	0:12:35	**0:53:42**	**x5.27**	**$4.8**
Shader Cache Population	0:47:59	0:09:18	**0:38:41**	**x5.16**	**$3.6**
Strategy Game Build	0:47:54	0:08:15	**0:39:39**	**x5.81**	**$3.2**

Topology

The Machine holding the **source code** (and initiating the build) was located on the Azure cloud in the East US 1 zone as well as the helper machines.

It was the only "Regular" **Incredibuild Agent** on the grid, and also had an installation of the **Coordinator** that controlled the provisioning of the Cloud helper machines.

The builds were triggered through an Azure DevOps Agent that was installed on the machine and kicked off the builds, however the same results were observed when the builds were launched through an RDP session to that machine using the Visual Studio or Unreal Editor for shader recompilation.

Initiator:
Instance type: Standard NC6_Promo
(6 vcpus, 56 GiB memory)
Data center Location: East US 1
OS: Windows 10 (1909)
Code base: Unreal Engine 4.24
Accelerated networking: **Enabled**
Disk Type: Standard SSD
Installations:
- Incredibuild Coordinator Installation on boarded to cloud
- Incredibuild Agent
- Azure DevOps Agent
- Visual Studio 2019

Helpers - IncrediBuild Cloud (x20):
Instance type: Standard F8s_v2 (8 vcpus, 16 GiB memory)

Data center Location: East US 1
OS: Windows 10 (1909)

Accelerated networking: Enabled
Disk Type: Standard HDD 64GB

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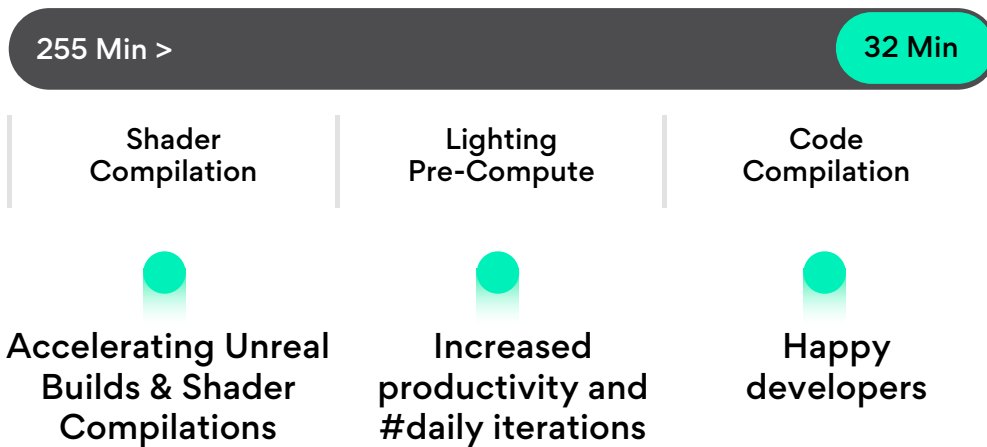
Top benefits of using Incredibuild Cloud:

- Access to thousands of cores and machines in the public cloud
- Seamless scalability on peak times with no maintenance hassle
- On-demand – in real-time, when you need it most
- Cost-efficient – purchase fewer cloud resources
- No migration required

Success Story

The Coalition, a Microsoft game studio, used Incredibuild to deliver two high-scale Gears of War AAA games in one year. They were able to pull it off by scaling Azure with Incredibuild into a 700-core virtual supercomputer, well beyond the limitation of Azure's most powerful single VM.

X8 Faster build times!

255 Min >		32 Min
Shader Compilation	**Lighting Pre-Compute**	**Code Compilation**
Accelerating Unreal Builds & Shader Compilations	**Increased productivity and #daily iterations**	**Happy developers**

"Incredibuild absolutely impacts our ability to iterate and move forward... Without Incredibuild, our development would grind to a halt." "

Joe Vogt IT MANAGER - THE COALITION