# Blueprint Nativization Support

# Current State of Things

Unfortunately, as of version 5.0, the Blueprint Nativization was officially deprecetated. This perhaps was motivated by the lack of support for certain operations (nodes), even by the stock engine features.

We however hope that the Unreal development team will rethink on this decision as this renders Blueprints a lot less performant (and thereby less usable) in certain scenarios that were formely well covered by Apparatus.

# Former Support

Blueprint nativization converts a virtualized blueprint code of the node to its C++ representation, that is compiled ahead of time instead of being interpreted at a runtime. For complex scenarios it can run a lot faster as C++ compilers are very intricate on optimizations.

Unfortunately, Unreal Engine doesn't support nativizatiion of the functions that perform *custom* blueprint virtual machine manipulations. Apparatus is quite a low-level tool with a bunch of functions exactly like that, so when you mark your Mechanic as nativized and then package a build you may get something like that in the console

```
UATHelper: Packaging (Windows (64-bit)):
.../Intermediate/Plugins/NativizedAssets/Windows/Game/Source/NativizedAssets
/Private/...cpp(657): error C3861: 'GetChunkChainTraitAt': identifier not
found
UATHelper: Packaging (Windows (64-bit)):
.../Intermediate/Plugins/NativizedAssets/Windows/Game/Source/NativizedAssets
/Private/...cpp(783): error C2039: 'SetSubjectTrait': is not a member of
'FCustomThunkTemplates'
```

Luckily there is a workaround that is quite easy to use.

You can actually and pretty painlessly change a single header file inside an Unreal Folder. It's located at a path like so: `C:\Program Files\Epic Games\UE_4.26\Engine\Source\Runtime\Engine\Public\GeneratedCodeHelpers.h`

Open this file in your preferred text editor and add the following code at the end of the `FCustomThunkTemplates` struct. As of version 4.26 the struct is declared at line 89. You should add the following snippet after the `public:` access specifier of the struct.

```
#pragma region Apparatus Nativization Support

    template <typename TSubjectHandle>
    static void
    SetSubjectTrait(TSubjectHandle& SubjectHandle,
                    UScriptStruct* TraitType,
                    void* InTraitData)
    {
        SubjectHandle.SetTrait(TraitType, InTraitData);
    }

    template <typename TSubjectHandle, typename T>
    static void
    SetSubjectTrait(TSubjectHandle& SubjectHandle,
                    UScriptStruct*  TraitType,
                    const T&        InTraitData)
    {
        SubjectHandle.SetTrait(TraitType, (const void* const)&InTraitData);
    }

    template <typename TSubjectHandle>
    static void
    ObtainSubjectTrait(TSubjectHandle& SubjectHandle,
                       UScriptStruct*  TraitType,
                       void* const     OutTraitData)
    {
        SubjectHandle.ObtainTrait(TraitType, OutTraitData);
    }

    template <typename TSubjectHandle, typename T>
    static void
    ObtainSubjectTrait(TSubjectHandle& SubjectHandle,
                       UScriptStruct*  TraitType,
                       T*              OutTraitData)
    {
        SubjectHandle.ObtainTrait(TraitType, (void* const)&OutTraitData);
    }

    template <typename TSubjectHandle>
    static void
    GetSubjectTrait(TSubjectHandle& SubjectHandle,
                    UScriptStruct*  TraitType,
                    void* const     OutTraitData)
    {
        SubjectHandle.GetTrait(TraitType, OutTraitData);
    }

    template <typename TSubjectHandle, typename T>
    static void
    GetSubjectTrait(TSubjectHandle& SubjectHandle,
                    UScriptStruct*  TraitType,
```

```
                    T&              OutTraitData)
    {
        SubjectHandle.GetTrait(TraitType, (void* const)&OutTraitData);
    }

    template <typename T>
    static void
    GetChunkChainTraitAt(const int32& ChunkChainId,
                         const int32  TraitIndex,
                         T&           OutTraitData)
    {
ensure(UMachine::ObtainChunkChain(ChunkChainId).GetTraitAt(TraitIndex,
(void* const)&OutTraitData)
               >= EApparatusStatus::Success);
    }

    template <typename T>
    static void
    GetChunkChainTraitAt(const int32& ChunkChainId,
                         const int32  TraitIndex,
                         T* const     OutTraitData)
    {
ensure(UMachine::ObtainChunkChain(ChunkChainId).GetTraitAt(TraitIndex,
(void* const)OutTraitData)
               >= EApparatusStatus::Success);
    }

#pragma endregion Apparatus Nativization Support
```

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