Blueprint Nativization 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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