Game | Conditional SubParts

Overview

Conditional (aka dynamic) Subparts allow users to dynamically spawn parts of a Block based on the current build progress and damage status. Together with Animations and Particle effects, they can be used to create a rich visual experience for the player and/or aid players in visual recognition of the Block's current activity state.

Subparts are spawned when block is:

- **Functional** (structurally fit to work)
- **No critical fracture is destroyed**

Gyro Block with active animated SubPart

Note that SubParts are not sensitive to non-critical fractures and will stay fully functional even when other parts of the Block are damaged or fully destroyed.

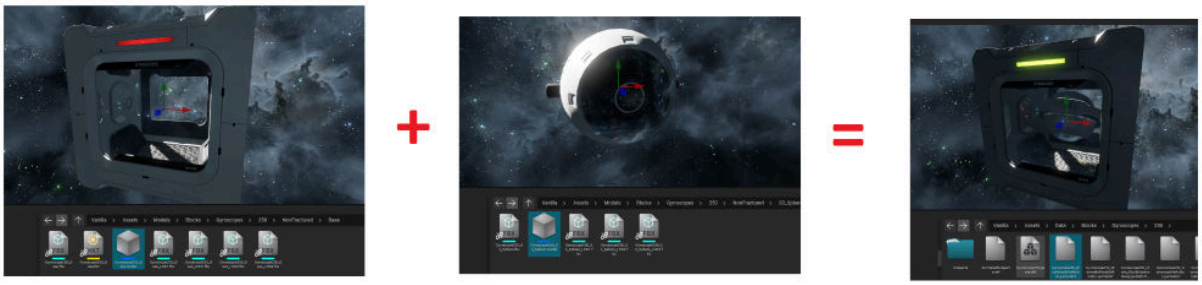
Partially destroyed Gyro Block with active SubPart

How to set up

Prerequisites

You'll need a standard Block Model set, including **Fractured** and **Deformed models**.
These models should **include** static geometry even for the dynamic **SubParts** and their physics should span around all SubParts.

Additionally you'll need the final **Optimized models**.
These should be **separate** assets. Each SupPart comes as a standalone model, and should look fully functional. Physics should be present only on the main model and span around all SubParts.



Data Setup

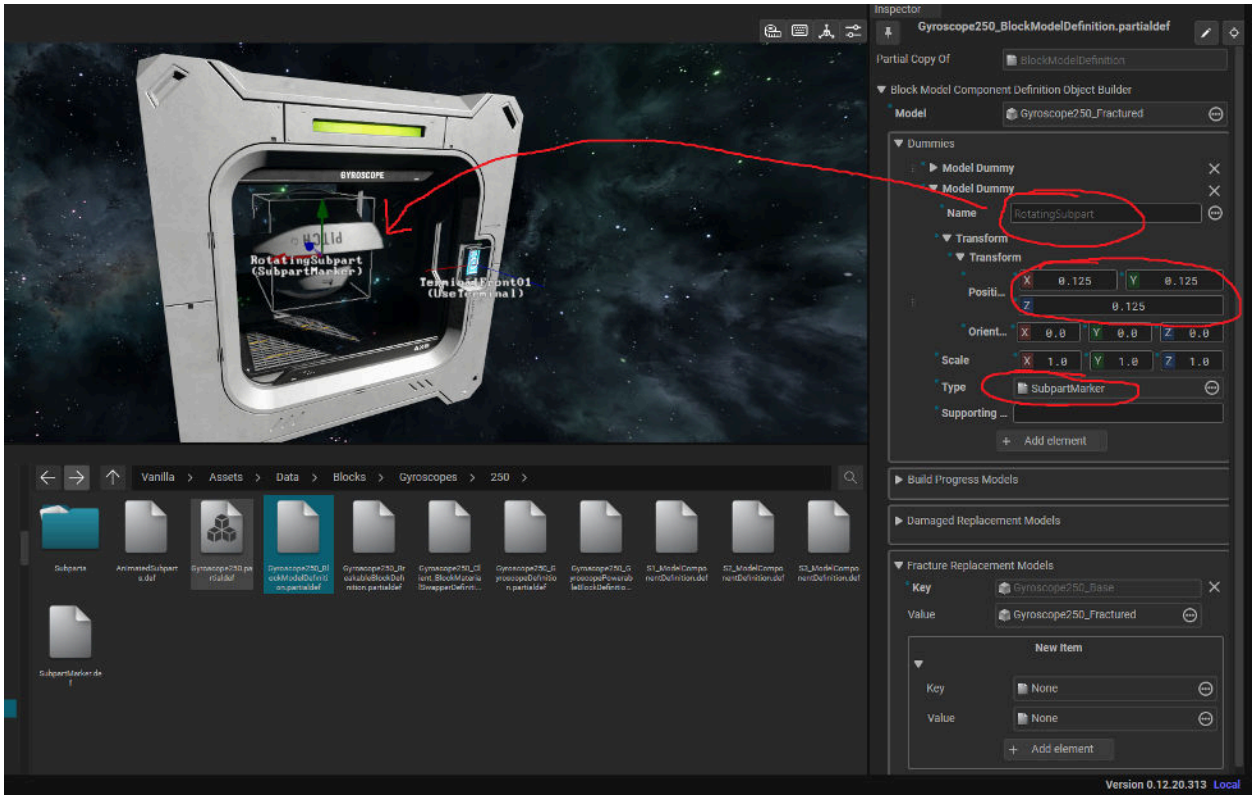
First prepare a standard Block, including all functional parts/logic/Components and build stages.
Make sure the block works in-game, everything is fine.

Only once you have a working Block, it's time to start adding detailing and dynamic bits.

SubPart Positioning

SubParts are automatically positioned to match Dummies.
Have one (or more) prepared in model or add one manually in Editor.

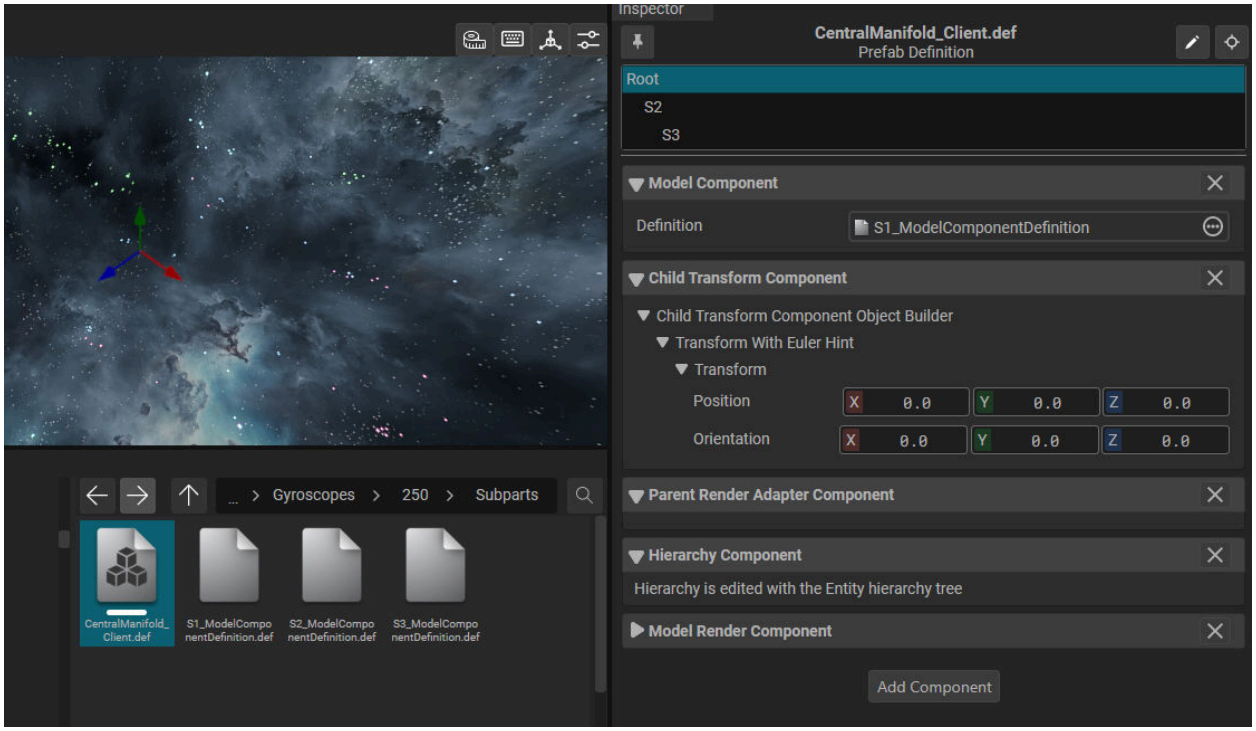
Positions can be adjusted later as needed so the first version doesn't need to be 100% precise.



Manually placed dummy in Editor

SubPart Content

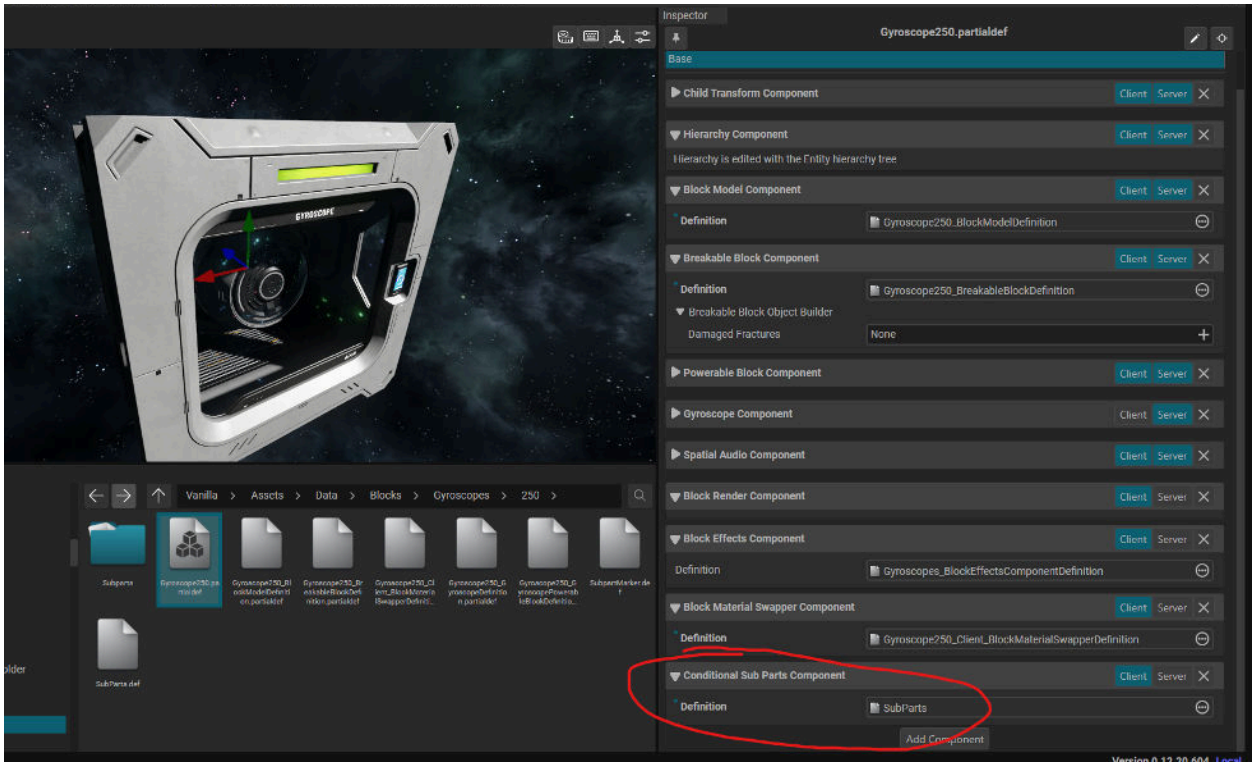
SubParts are modeled as Prefabs.
Most common are simple Entities with single Model + Render, but multi-layer constructs with Animations, Particles and Lights are also permitted. Imagination be your guide.



Multi-layer SubPart with many models

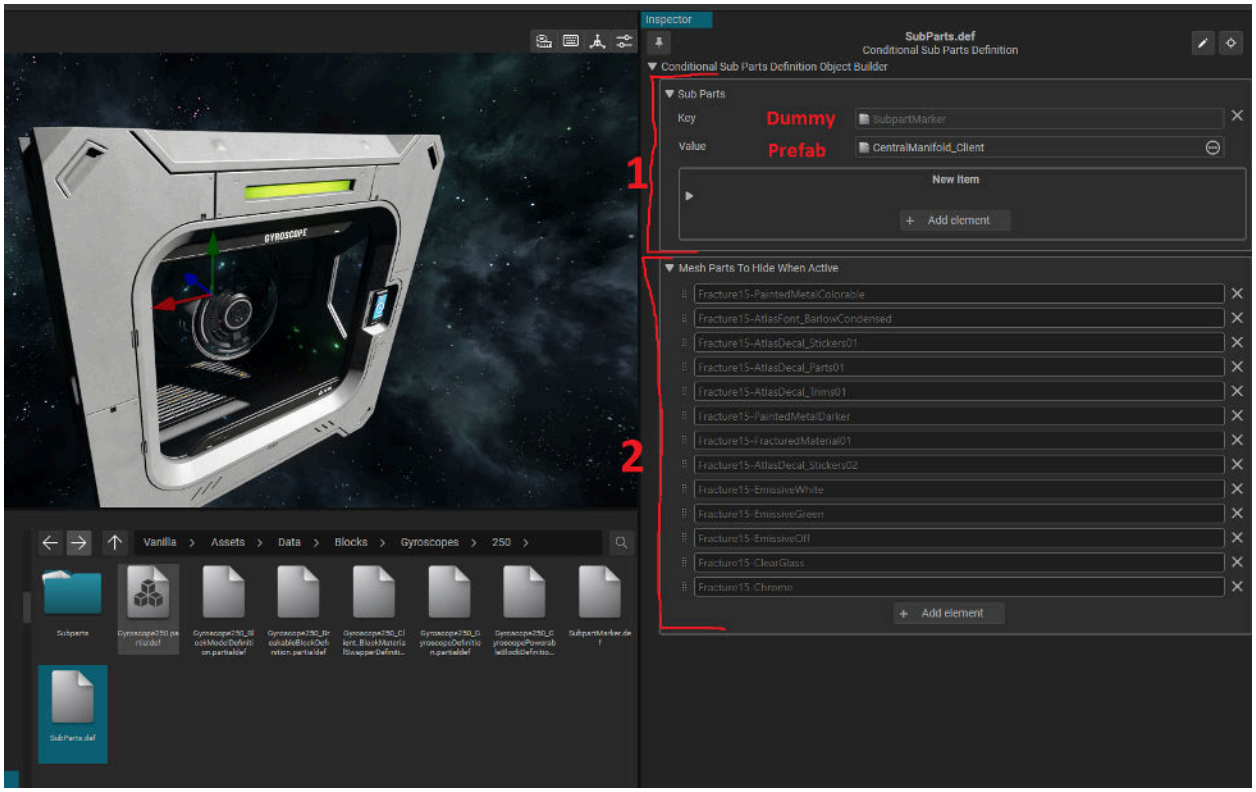
Pairing SubPart with Block

Add ConditionalSubPartsComponent to the Block Prefab (for visual-only effects make it Client-only) ...



...and to the Component Definition specify

1) Dummy that should be used for the positioning and Prefab that should be used for the SubPart content
2) Optionally Mesh Parts that should be hidden from the main model when the dynamic SubParts are active



Your block should be now fully functional.
Refresh preview in Editor to observe the dynamic parts and test in-game.

Additional Effects

Once basic parts are verified to be working, additional effects can be added to the SubParts.

Debug Draw

In order to aid debugging of various problems that can happen during the setup, there are number of Debug Draws that can be used

1) Dummies can be rendered to visualize the SubPart position and orientation

2) SubPart name and spawn status can be visualized
3) Debug rotation can be enabled on the SubPart to clearly distinguish static model parts from parts rendered by the dynamic SubParts (and to detect if there is any sneaky geometry hidden inside the parts)


Performance
Frame: 27466
Main Thread: 7.60ms, 45.62 x
Input: 193.40us
Draw: 5.28us
Platform: 313.50us
Session: 2.14ms
Render Thread: 14.92ms, 94.0 x
GPU: 13.97ms, 279.3 x, (Imprecise)
Render Frequency: 63.65Hz, 200.00Hz, VSync: Disabled
Worker Pool: 0.02 x
Load: 0.02 x
Worker Count: 6
Spatial Trigger System
Entity updates: 1
Total Trigger Updates: 0
Trigger Count: 0
RotatingSubpart
310
0.0 m/s
50/1
GameDataLoader
Transitions
Gameplay
Blueprints
DebugDraw (Client)
Surface Offset
0.001
Show Generator Debug Data
On
Show Surface Cells
Off
Show Collider Bounds
On
Show Samples
On
Collider Bounds Inflation Size
0.01
Show Debug Text
Off
Show Fracture Ids
Off
Fracture Id Text Scale
0.35
Highlight Primary Mount Point
On
Draw Type
Draw Type
Draw Type
Draw Type
Name:
Stat collection
Stale
Off
Data
None
Draw Type
Name:
SubParts
Stale
On
Data
Show Spawns
On
Debug Rotate
Off
Draw Type
Name:
TimeToClose
Stale
Off
Data
None
Draw Type


Performance
Frame: 34907
Main Thread: 8.10ms, 48.62 x
Input: 160.92us
Draw: 4.32us
Platform: 275.14ns
Session: 2.38ms
Render Thread: 15.10ms, 96.2 x
GPU: 14.47ms, 289.5 x, (Imprecise)
Render Frequency: 63.55Hz, 200.00Hz, VSync: Disabled
Worker Pool: 0.01 x
Load: 0.01 x
Worker Count: 6
Spatial Trigger System
Entity updates: 2
Total Trigger Updates: 0
Trigger Count: 0
RotatingSubpart
Deformation
310
0.0 m/s
50/1
GameDataLoader
Transitions
Gameplay
Blueprints
DebugDraw (Client)
Surface Offset
0.001
Show Generator Debug Data
On
Show Surface Cells
Off
Show Collider Bounds
On
Show Samples
On
Collider Bounds Inflation Size
0.01
Show Debug Text
Off
Show Fracture Ids
Off
Fracture Id Text Scale
0.35
Highlight Primary Mount Point
On
Draw Type
Draw Type
Draw Type
Draw Type
Name:
Stat collection
Stale
Off
Data
None
Draw Type
Name:
SubParts
Stale
On
Data
Show Spawns
On
Debug Rotate
Off
Draw Type
Name:
TimeToClose
Stale
Off
Data
None
Draw Type