# Doors Technical Design Documentation

## Overview

- This Documentation Details the implementation of the Interactive Door feature. For more information on the design please see the **Interactive Door Feature Design Document**.
- If you have any questions, please speak to: Kenneth Ma (Technical Designer).
- Blueprint name: BP_Door_Master
- Folder Location: *\Content\LevelPrototyping\Blueprints*

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## User Stories

These are the User Stories the implementation of this feature must address (taken from the **Interactive Door Feature Design Document**).

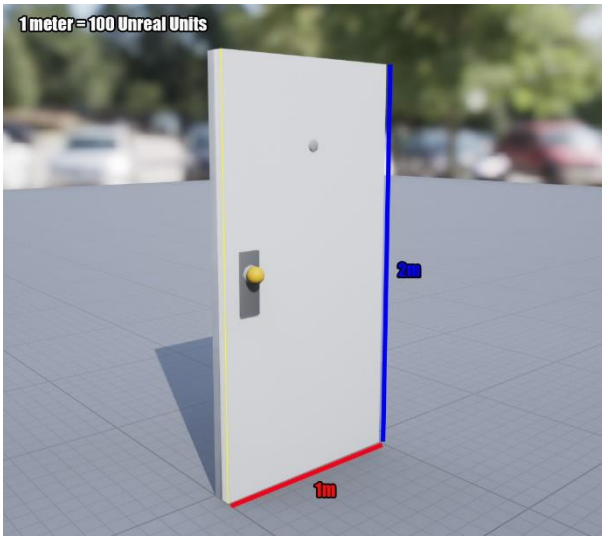
- As a player I must to be able to open doors to help me navigate through the space
- As a player I must to close doors behind me to control the space and escape enemies
- As a player I must be informed or intuitively know how to interact with the door
- As a player I must be able to differentiate if the door is locked or unlocked.

- As a Level Designer I need to be able to use doors to control the flow point between rooms
- As a Level Designer I must be able to place the door into the environment and select the type with ease.
- As a Level Designer I must be able to select the initial door state and any requirements (locked, open, required object to open)

- As a Designer I need the ability to have multiple visual variations of doors to dress, prop, and build environmental functional narrative.
- As a Designer I must be able to reiterate the design with ease.

# Visual Brief

Gameplay and Technical Considerations for the visuals of the Doors.

| Visual Description | Concept Art |
|---|---|
| Doors should always be the same dimensions (See Door Types) |  |
| Doors should block the players vision | N/A |
| Doors should be able to pivot from hinges to replicate a real door | N/A |
| Doors are indestructible | N/A |

## Door Types

The main types of doors that will be used in the game are:

Measurement reference: 1m = 100 Unreal Units

| Door Type | Dimension | File Location |
|---|---|---|
| Single Door | 2 (H) x 1 (W) m | *\Content\Meshes\Doors* |
| Double Door | TBD | TBD |

## Door Variants

Doors will have different variants depending on the environment. This is purely for visual purposes to signify which part of the environment the player is in.
**All Variants need to remain the same dimension so they can be switched out within the same Gameplay Object.**

| Door Variants | Description | Use Case | File Location |
|---|---|---|---|
| Basic Door | Doors with no notable visual features. Basic and can be used in various places. | Hallways, standard offices, cupboards, | *\Content\Meshes\Doors \SM_BasicDoor.uasset* |
| Reinforced Door | Door which looks sturdy and signifies whether it is Locked / Unlocked (would need material swap for this) | Lab rooms, High Security Offices | *\Content\Meshes\Doors \SM_ReinforcedDoor.uasset* |
| Fancy Door | A salient door that looks more high class | Meeting rooms, Bedrooms, Ballroom, | *\Content\Meshes\Doors \SM_FancyDoor.uasset* |

# Functional Overview

| Priority | Function | Description | Completed |
|---|---|---|---|
| Must | Interaction | Players can interact with the door via a key tap interaction.<br><br>The interaction should fire a line trace ahead of the player to detect actors that implement an Interact interface. | DONE |
| Must | Interaction prompt | When players are within a certain distance to the door, an interaction prompt will appear.<br><br>A box collision is used and when players are within or outside of it, the interaction prompt is displayed or removed accordingly. | DONE |
| Must | Toggle Open / Closed States | Doors should toggle from Open / Closed state when interacted with via a Boolean | DONE |

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|---|---|---|---|
| | upon interaction | variable. | |
| Must | Door Variants can be changed in Editor | A primary data asset will contain the following variables:<br>• Static Mesh.<br>• Multiple sound cues required for door states.<br>• Material interface for door states.<br>• An Enum containing selective animation types.<br><br>Creating a data asset instance of the primary data asset will allow ease of switching Door Variants without having to change the actor. | DONE |
| Must | Toggle door state to be locked/unlocked | An exposed Boolean variable will allow designers to decide if door is locked or unlocked by default. | DONE |
| Must | Audio for different states:<br>• Locked<br>• Unlocked<br>• Open<br>• Close | Play audio cue to provide feedback to the player when the door is interacted with according to its current state. | DONE |
| Must | Door automatically closes after an allocated time the player is away from the door when left open. | A collision box will be used to ensure that the player is away from an open state door.<br><br>Using Set Timer by Function Name/ Clear Timer nodes (depending on when the player is within the collision box) and after a set time the player is outside the collision box, the open door should close. | DONE |
| Should | Change direction doors open | Doors should be able to swing both ways to give Designers control on whether they should swing away from the player or be fixed to swing a certain position | DONE |
| Should | Customizable speed rate of which the door opens. | Designers should be able to tweak the speed rate at which the door opens upon interaction. | DONE |
| Could | Doors could have option to | Doors could slam behind a player to create tension / surprise. This slam time | DONE |

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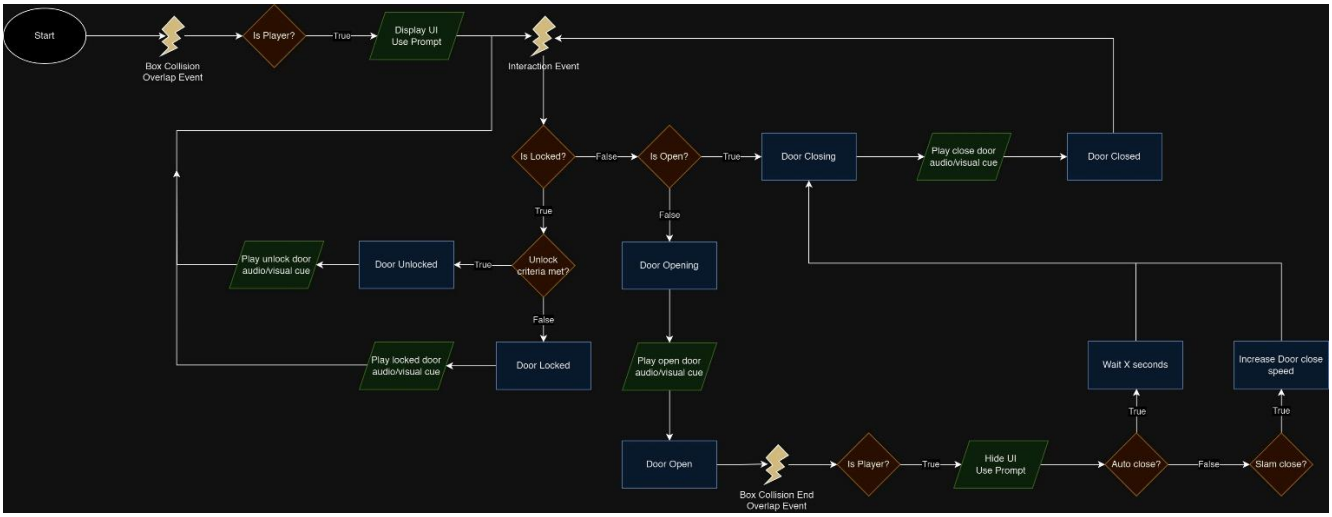
|---|---|---|---|
| | close on their own | and speed should be adjustable for the Designers. | |
| Could | Allow doors to start ajar. | Door starts ajar. | DONE |

## Gameplay Flow




## Door States

| State | Description |
|---|---|
| **Closed** | This is an Interactable state where players can open the door manually. |
| **Open** | This is an Interactable state where players can close the door manually, or it will automatically close after the allocated time. |
| **Opening** | Enters this state upon interaction with a closer door that can open. |
| **Closing** | Enters this state upon interaction with an open door. |
| **Locked** | A door that cannot be opened and remains closed. |

| | |
|---|---|
| **Unlocked** | Allows a door to be open either by default or upon fulfilling a requirement. |

## Asset List

| Asset | Description | Departments Involved | Delivered |
|---|---|---|---|
| Static Mesh | Static Mesh for the different door variants | Environment Art | PLACEHOLDER |
| Audio | Sound effects for each respective door and their desired state feedback.<br><br>• Opening<br>• Closing<br>• Locked<br>• Unlocking | Sound Design | PLACEHOLDER |
| Textures/Materials | Materials to be applied to the static mesh doors and the desired materials when doors are locked/unlocked | Environment Art | PLACEHOLDER |
| Door state animation | Animations according to each door transition states (open, close etc). | Animation | PLACEHOLDER |
| Primary Data/Data assets | A primary data asset will contain the following variables:<br><br>• Static Mesh.<br>• Multiple sound cues required for door states.<br>• Material interface for door states.<br>• An Enum containing selective animation types.<br><br>Data assets should be created for each door type that inherit | Technical Design | PROTOYPE |

| | | | |
|---|---|---|---|
| | from the primary data asset. | | |
| UI image for interaction prompt | A UI image that will be displayed when players are within distance to interact with the door. | UI | PLACEHOLDER |

## Parameter Cheat Sheet

These are options available for LDs to customize the door gameplay.
They can be found in the **Details panel of BP_Door_Master** and its child actors under "Exposed Door Options".
**Prototype Level**: *Content**ThirdPerson**Maps**Door_Overview_Demo*

| Parameter Name | Variable Type | Description |
|---|---|---|
| Refresh Settings | Function | Force run logic to update any changes that are not applied whilst in editor. |
| Door Variant | Data Asset Reference drop down | Changes the variant of the door to the desired type. Refer to *How to create new Door Variants* below. |
| Door Locked? | Bool | Door will start locked when ticked. |
| Prompt Display Distance | Vector | Size of overlap box so when player walks into it, the interact UI prompt is displayed. |
| Reverse Door Opening Direction | Bool | Door will open towards the player when ticked. |
| Open Door Speed in Seconds | Float | How many seconds it takes for the door to open from closed. |
| Close Door Speed in Seconds | Float | How many seconds it takes for door to close from opened. |
| Door Ajar Angle | Float | Default Z rotation angle of door upon start. |
| Auto Close? | Bool | Door will automatically close |

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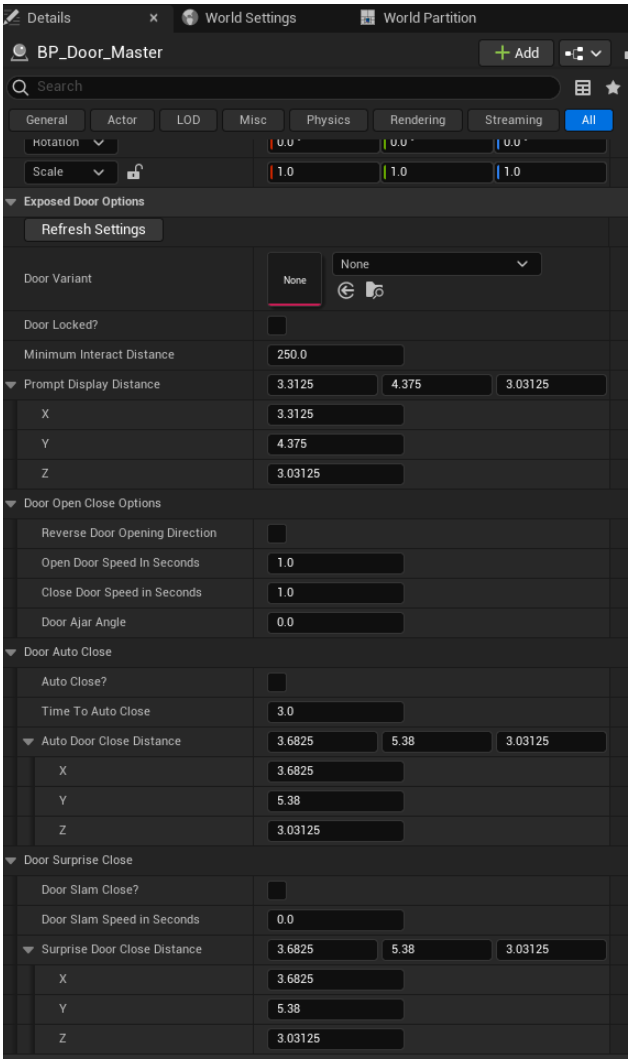
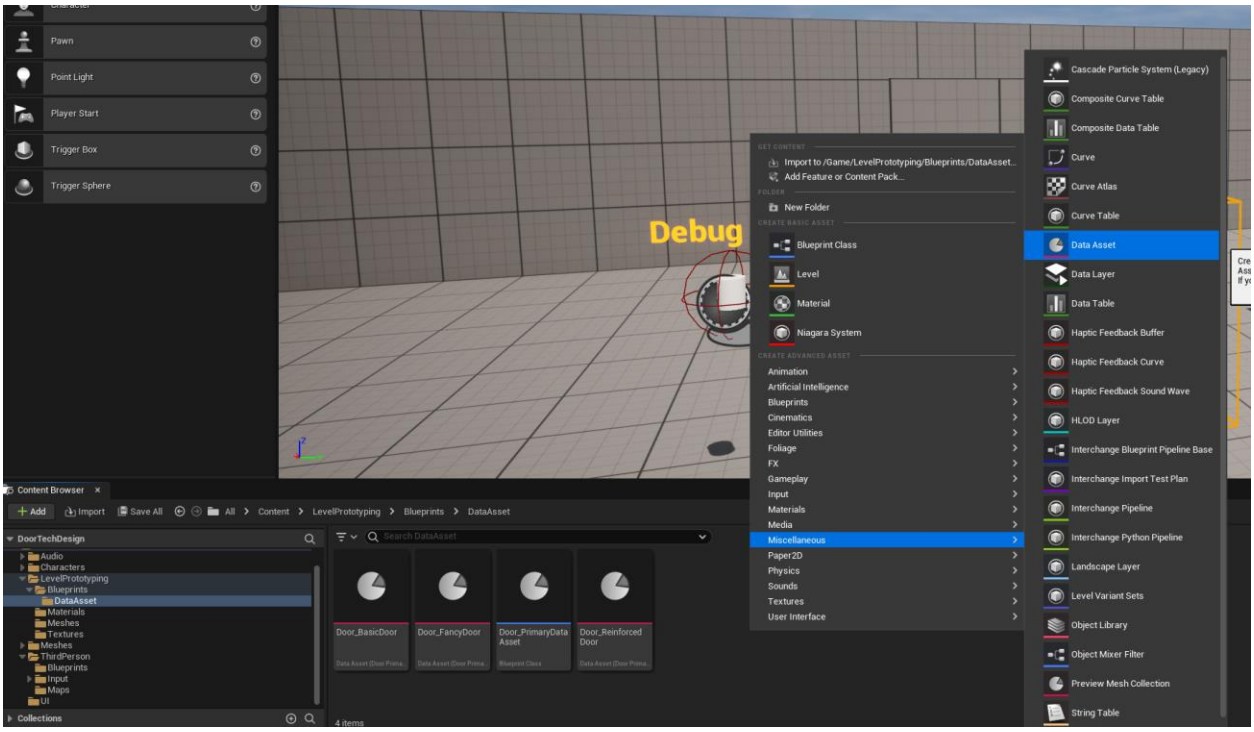
|---|---|---|
| | | when ticked. |
| Time to Auto Close | Float | Time taken for the door animation to go from open to close. **Auto Close must be ticked, this will also disable Door Slam Close.** |
| Auto Door Close Distance | Vector | Size of overlap box so when player walks out of it, the door will automatically close. **Auto Close must be ticked.** |
| Door Slam Close? | Bool | Door will slam close when ticked. **This will disable Auto Close.** |
| Door Slam Speed in Seconds | Float | Time taken for the door animation to go from open to close. **Door Slam Close must be ticked.** |
| Surprise Door Close Distance | Vector | Size of overlap box so when player walks out of it, the door will slam close. **Door Slam Close must be ticked.** |

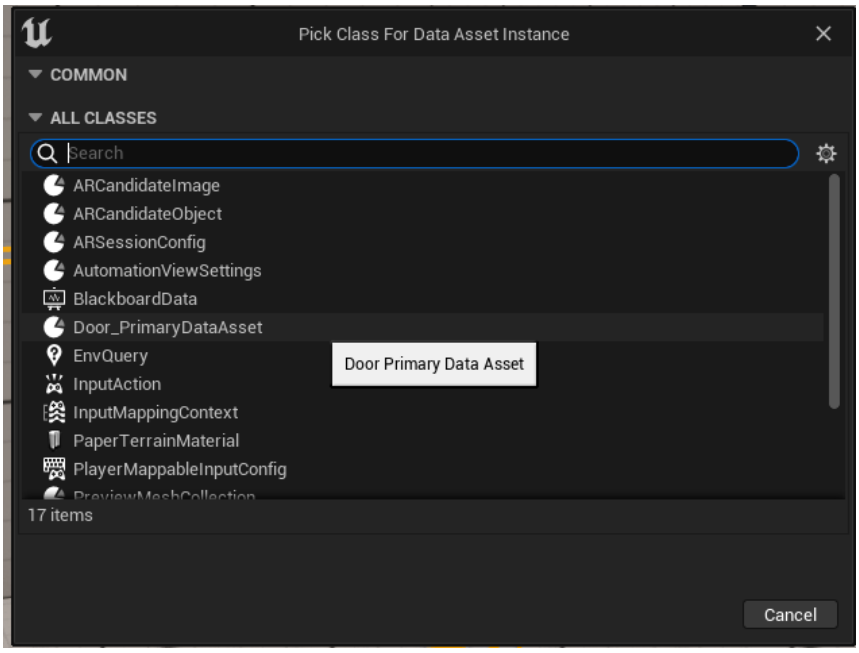



## How to Create new Door Variants

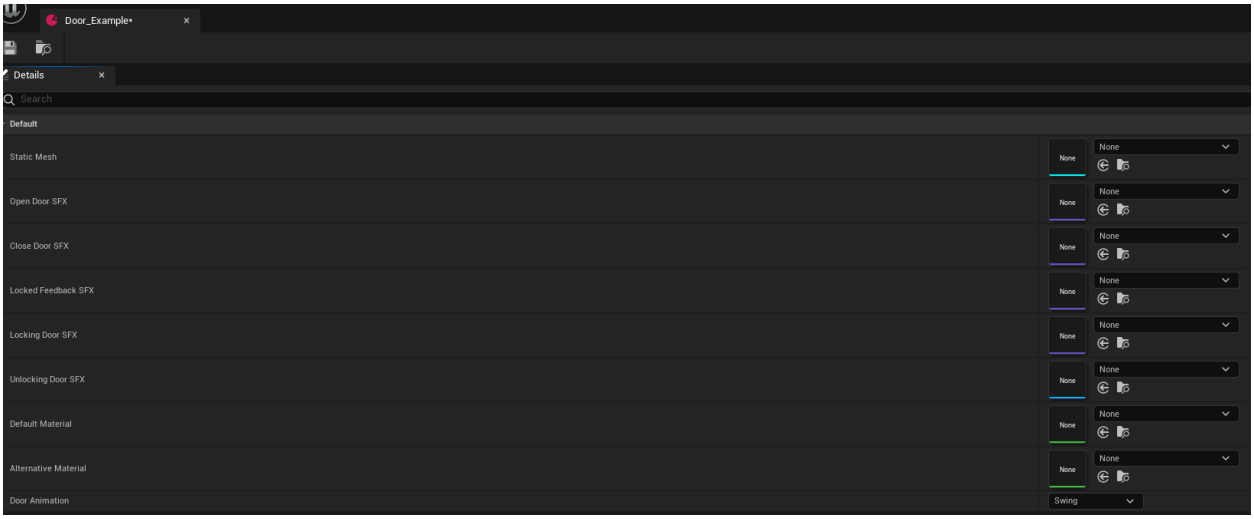
1. Inside *\Content\LevelPrototyping\Blueprints\DataAsset* create a Data Asset by right-clicking in the Content Browser and selecting Miscellaneous > Data Asset




2. Select the class *Door_PrimaryDataAsset*

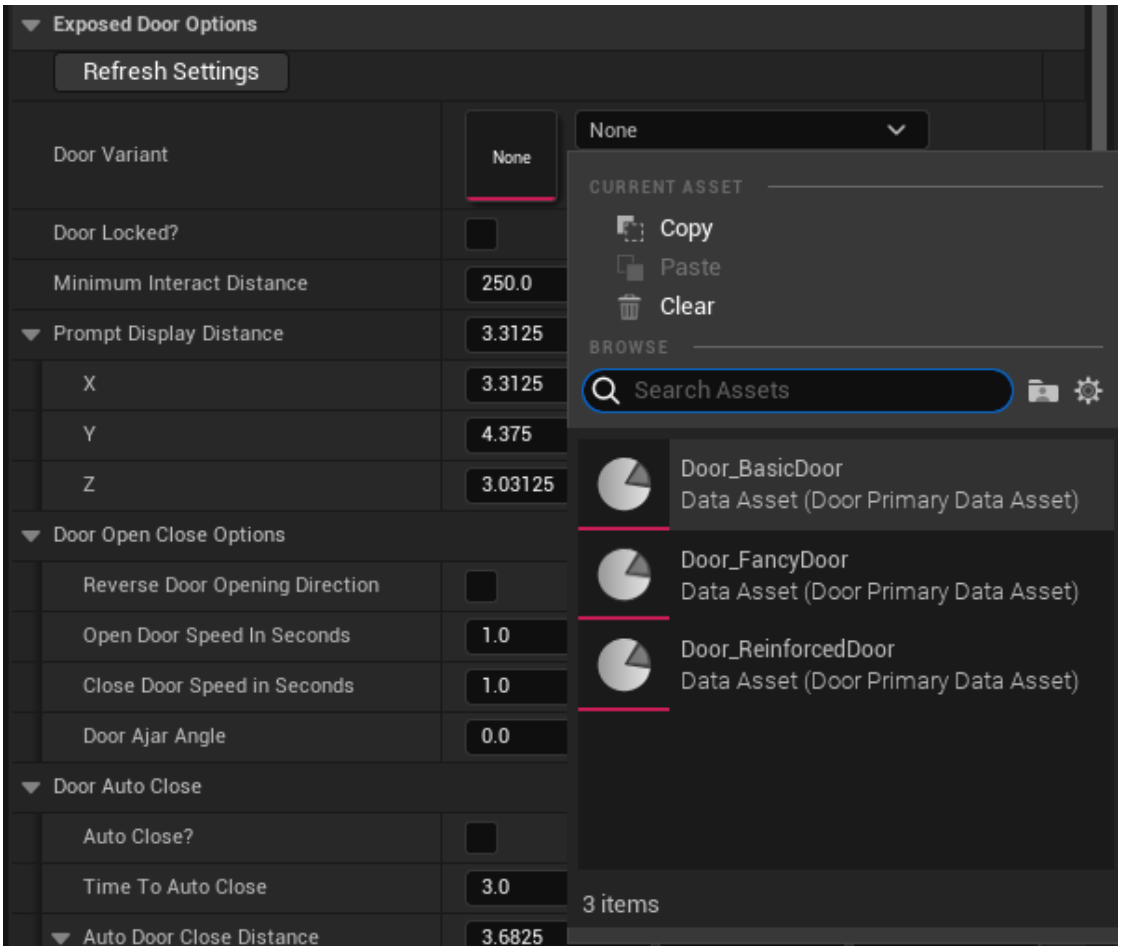



3. Rename the newly created Data Asset accordingly to the naming convention: Door_**INSERT DOOR VARIANT NAME HERE**
4. Open up the Data Asset and fill in the variables accordingly through the drop downs.



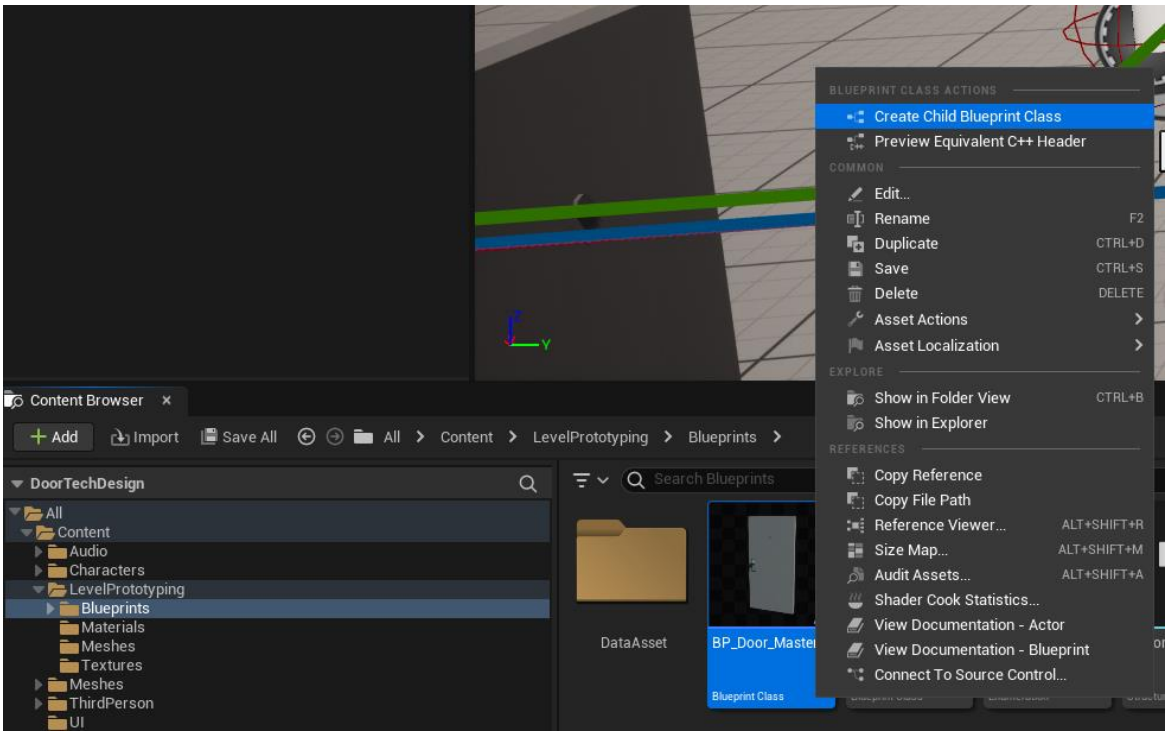

| Variable Name | Type |
|---|---|
| Static Mesh | Static Mesh |
| Open Door SFX | Sound Base |
| Close Door SFX | Sound Base |
| Locked Feedback SFX | Sound Base |
| Locking Door SFX | Sound Base |
| Unlocking Door SFX | Sound Base |
| Default Material | Material Interface |
| Alternative Material | Material Interface |
| Door Animation | EDoor Animation (Enumeration) |

5. Drag in or select an existing instance of *BP_Door_Master* within the level and in the Details panel under Door Variant, select the newly created Data Asset from the drop-down selection.
   Note: If there are no visual or setting changes seen, click on the Refresh Settings button.


Exposed Door Options
Refresh Settings
Door Variant
None
None
Door Locked?
Minimum Interact Distance
250.0
Prompt Display Distance
3.3125
X
3.3125
Y
4.375
Z
3.03125
Door Open Close Options
Reverse Door Opening Direction
Open Door Speed In Seconds
1.0
Close Door Speed in Seconds
1.0
Door Ajar Angle
0.0
Door Auto Close
Auto Close?
Time To Auto Close
3.0
Auto Door Close Distance
3.6825
CURRENT ASSET
Copy
Paste
Clear
BROWSE
Search Assets
Door_BasicDoor
Data Asset (Door Primary Data Asset)
Door_FancyDoor
Data Asset (Door Primary Data Asset)
Door_ReinforcedDoor
Data Asset (Door Primary Data Asset)
3 items

## How create a child blueprint (Adding additional unique functionality)

1. Create a Data asset accordingly using the steps above (How to Create new Door Variants)
2. In the content browser search for then right-click *BP_Door_Master*, and select **Create a Child Blueprint Class.**

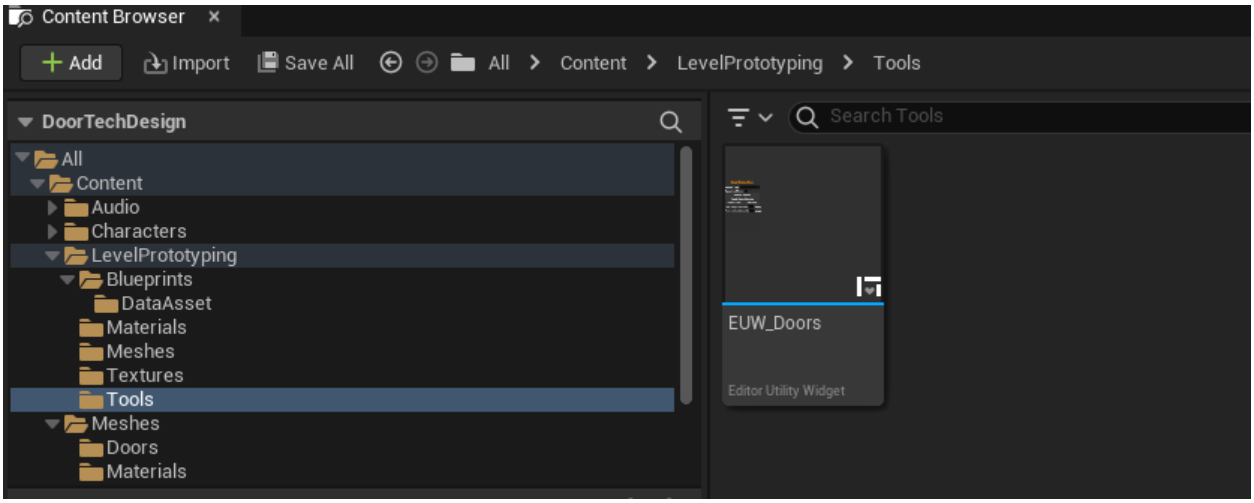



3. Rename the newly created Blueprint with the naming convention BP_Door_**INSERT DOOR VARIANT NAME HERE.**
4. Open the Blueprint and under the Door Variant variable located in the Details panel, select from the drop down the required Data Asset.
5. You can now create additional unique functionality within the newly created child blueprint. (NOTE: Functionality that existed in BP_Door_Master will still function).

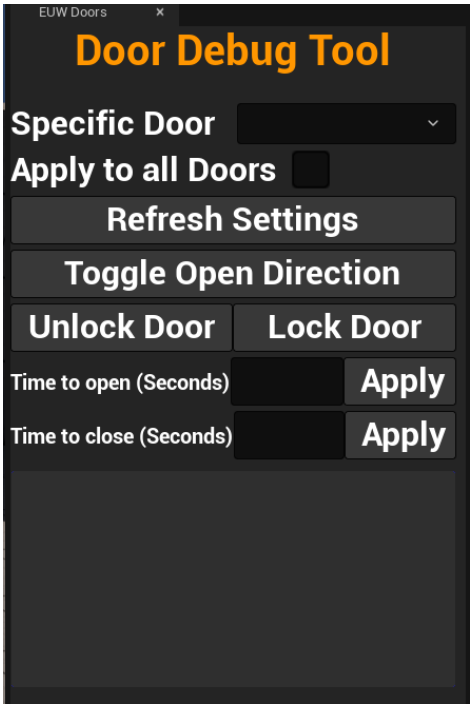
# Door Debug Tool

The door debug tool in the form of a Editor Utility Widget is available that allows you to edit specific or all door instances (**as long as they are Blueprints that inherit from BP_Door_Master**)

Folder Location: *\Content\LevelPrototyping\Tools\ EUW_Doors*




To run the tool, right-click on the EUW_Doors and select “Run Editor Utility Widget” and this should create the door debug tool window which you can also dock within your editor layout.



Door debug options are as follows:

| Debug Name | Input Type | Description | Notes |
|---|---|---|---|
| Specific Door | Drop down | Drop down should allow you to select one actor in the level that inherits from BP_Door_Master. | Required field to make any changes unless “Apply to all Doors” is checked. |
| Apply to all Doors | Check box | Allows the option to apply any changes to all doors that inherit from BP_Door_Master when ticked. | Required field to make any changes unless a selection has been made under “Specific Door”. |
| Refresh Settings | Button | When clicked, this will refresh the door settings that were not applied after making changes. | Forces the construction script to rerun in the case it does not refresh upon making any changes. |
| Toggle Open Direction | Button | Toggles door direction of which it opens towards (Indicated by a red arrow) | |
| Unlock Door | Button | Sets selected door to unlocked. | |
| Lock Door | Button | Sets selected door to locked. | |
| Time to open (Seconds) | Editable Textbox/Button | Time it takes in seconds for the door to fully open. | The text field only supports numeric entries otherwise it will not apply. |
| Time to close (Seconds) | Editable Textbox/Button | Time it takes in seconds for the door to fully close. | The text field only supports numeric entries otherwise it will not apply. |

| | | | |
|---|---|---|---|
| Status Window (Read Only) | Multi-line textbox | Provides the state of the current selected door settings. | Currently only works with “Specific Door” selected and provides feedback when changes have been made. |

### Door debug tool requests

Please get in touch with Kenneth Ma for any questions, issues or requests related to the Door debug tool and feel free to add it to the table below.

| Debug Request | Description | Comments |
|---|---|---|
| | | |
| | | |

## Future Problems / Considerations

| Problem | Possible Solution | Disciplines Required | Comments |
|---|---|---|---|
| When opening a door, how far do we want it to open as this could conflict with level layout such as clipping. | Create an open angle variable that allows designers to customize accordingly.<br><br>Alternatively, we can have the door static mesh collision trigger a Hit event which stops the door from moving. | Designers<br>Level designers.<br>Animation | We want to ensure that we set a minimum door angle to support the player character size.<br><br>Animation team could review and create a door ease of some type when it hits an obstacle so it doesn’t abruptly stop. |
| How do we want to drive the door animations? | We can use Sequencer or hard code the door animations. | Designers<br>Animation | |

| | | | |
|---|---|---|---|
| When the door starts ajar, do we want the door to open or close by default when interacted with? | Depending on how we plan to implement the animation, we can provide a Boolean option to decide if the door should open/close when interacted with.<br><br>The animation rate can be adjusted accordingly and play forwards or backwards. | Designers<br>Animation | |
| Should doors not be interactable as they are opening and closing? | Create a Boolean to track if it is in the middle of an open/close animation, if true then door should not be interactable till animation is finished. | Designers | |
| Should there be a separate door SFX when it slams? | Create and implement door slam SFX according to door type | Designers<br>Sound Design | |