


Modular environment Design

Or how I learned to stop worrying and love the grid!



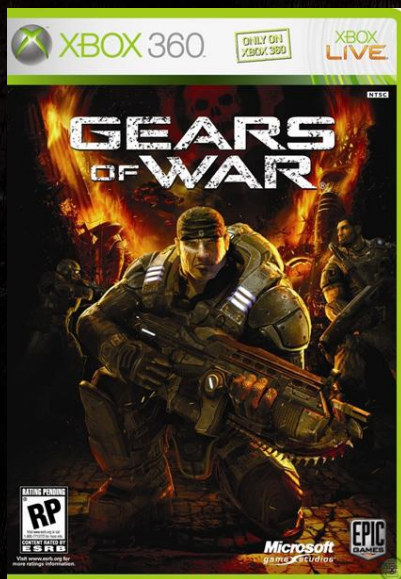
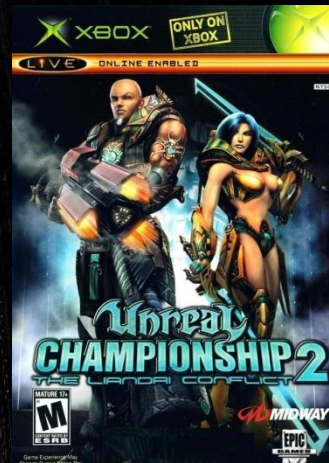
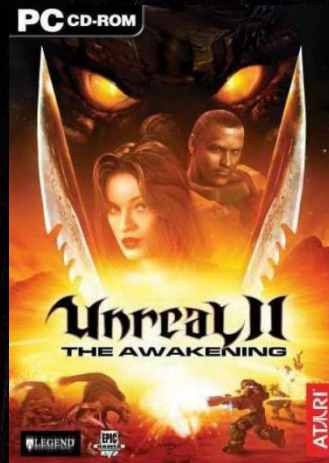
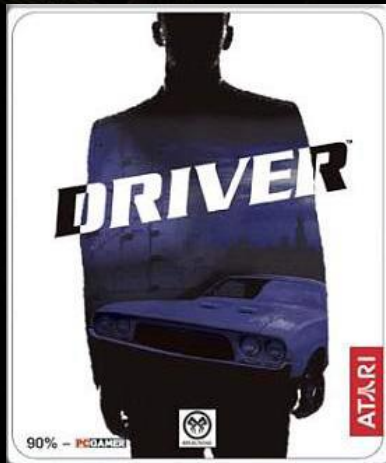


Kevin Johnstone

Senior Environment Artist

- Scotland – Quake – 1st job at Reflections
- Met a woman ,travelled round Europe
- Developed a love of European buildings
- Built my portfolio up until I could get to Epic

Shipped Titles



What I do at Epic

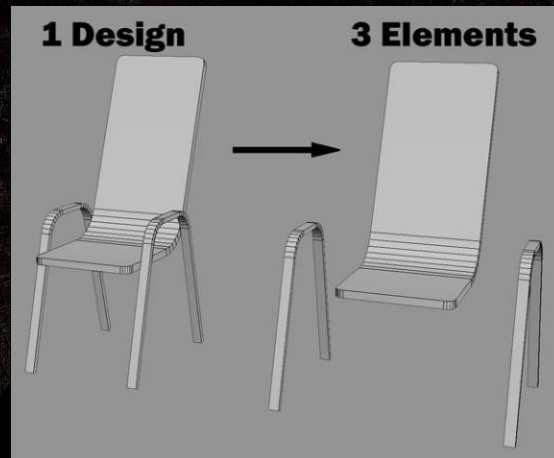
- I make fancy pieces of LEGO for Level Designers
- Concept artist – Environment Artist – LD's
- Shelling first – Visuals After
- My goal is to make art that the LD's can use

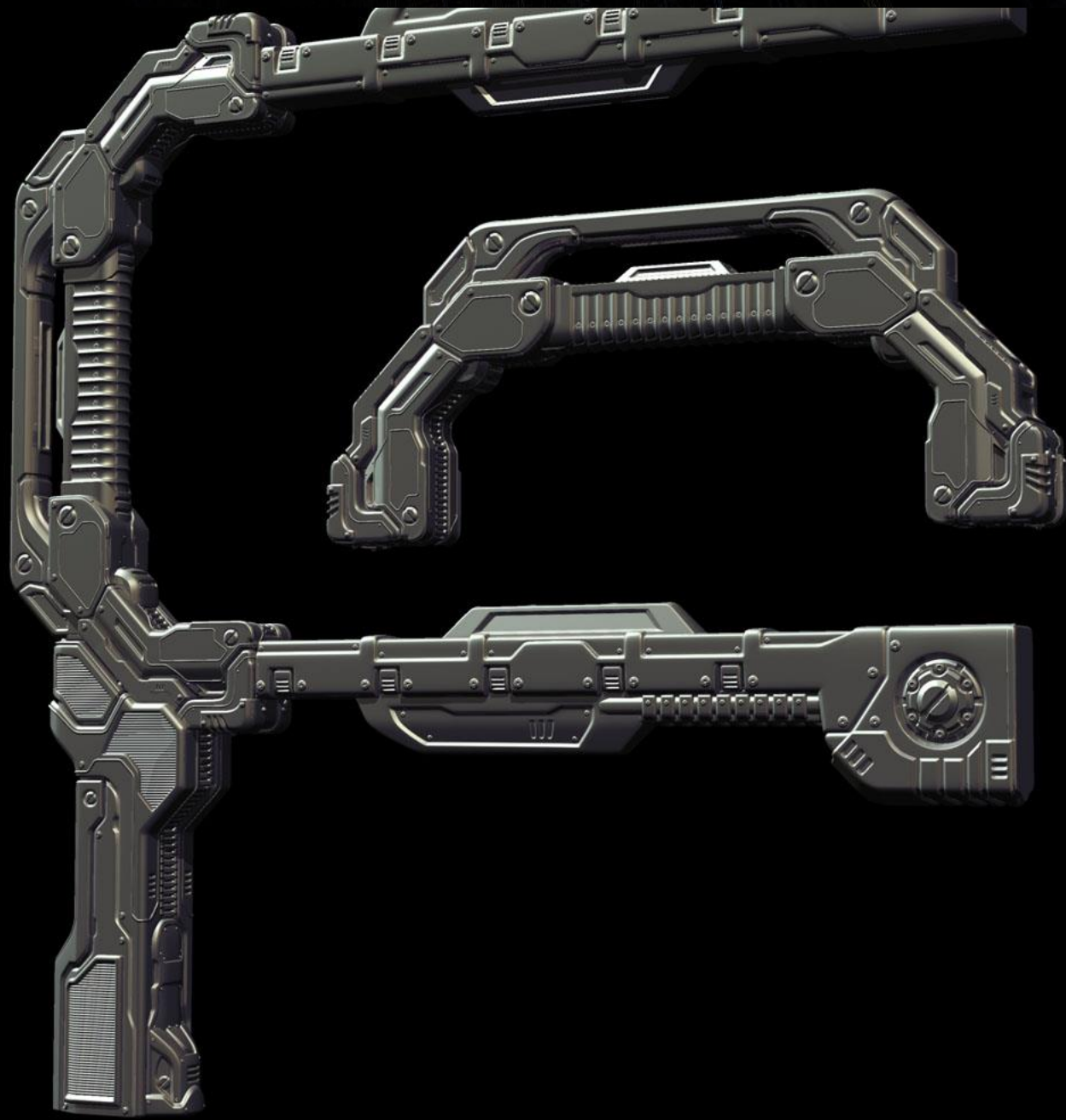
Main Environment art problems

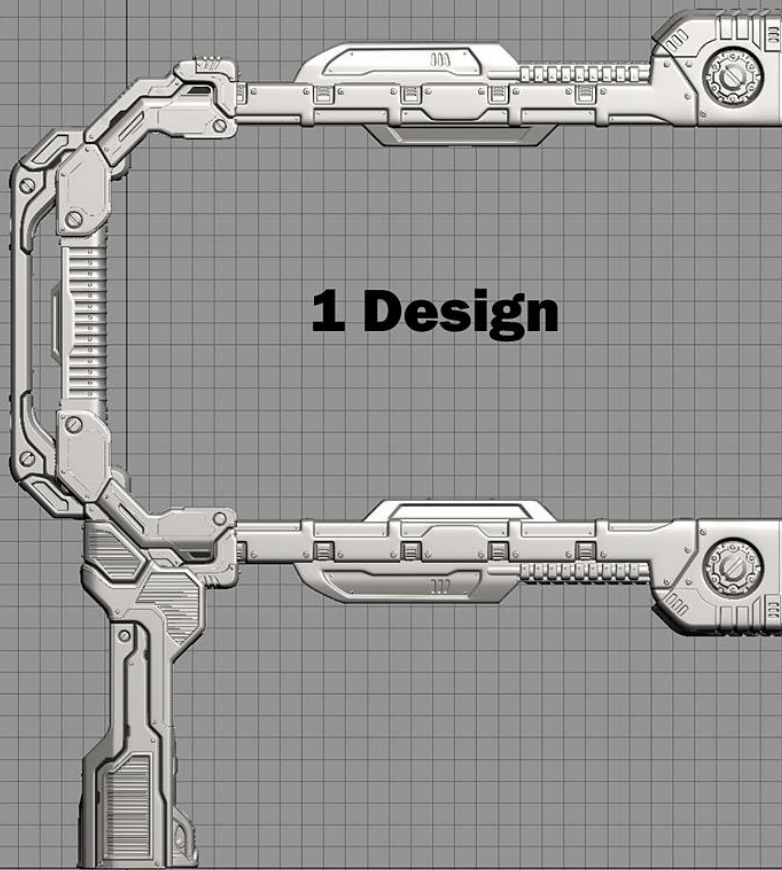
- Time required to author content
- Heavier texture load (D + S + E + N)
- Maintaining texture resolution
- Building pieces that are useful and adaptable

Element based modularity

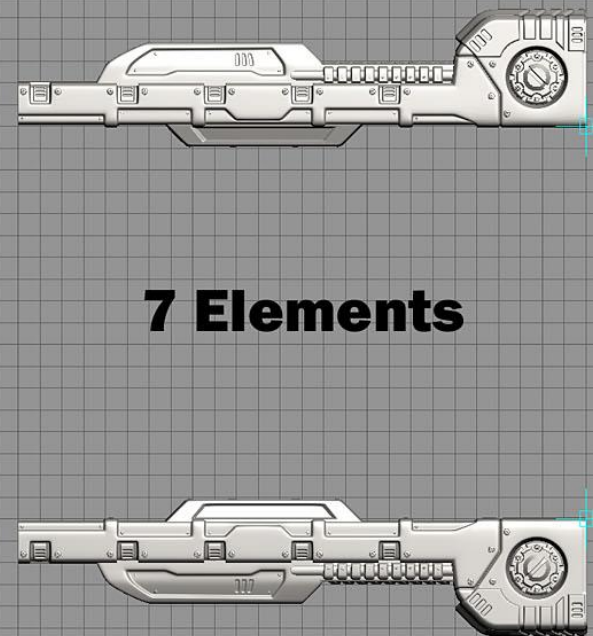
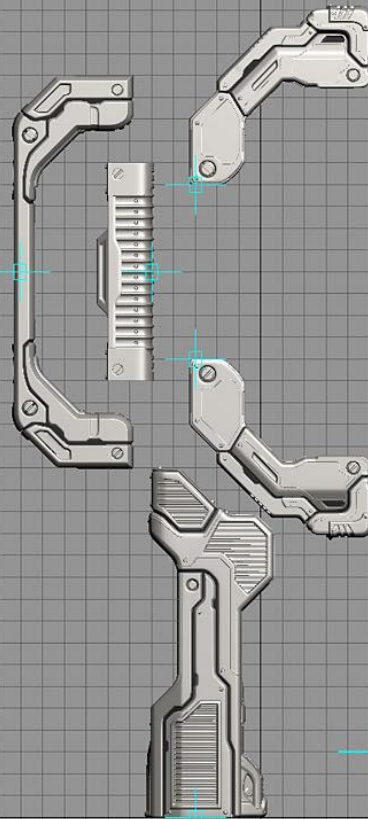
- Spotting the patterns of repetition
- Most designs are a number of merged elements
- Grid allows superior control of elements







1 Design



7 Elements



Grid and Snap Settings

Snaps Options Home Grid User Grids

Standard Override Off

<input checked="" type="checkbox"/> Grid Points	<input checked="" type="checkbox"/> Grid Lines
<input type="checkbox"/> Pivot	<input type="checkbox"/> Bounding Box
<input type="checkbox"/> Perpendicular	<input type="checkbox"/> Tangent
<input type="checkbox"/> Vertex	<input checked="" type="checkbox"/> Endpoint
<input type="checkbox"/> Edge/Segment	<input checked="" type="checkbox"/> Midpoint
<input type="checkbox"/> Face	<input type="checkbox"/> Center Face

Clear All

Grid and Snap Settings

Snaps Options Home Grid User Grids

Marker

Display Size: 20 (pixels)

General

Snap Preview Radius: 30 (pixels)

Snap Radius: 20 (pixels)

Angle: 2.5 (deg)

Percent: 10.0 (%)

Snap to frozen objects

Translation

Use Axis Constraints Display rubber band

Use Axis Center As Start Snap Point

Grid and Snap Settings

Snaps Options Home Grid User Grids

Grid Dimensions

Grid Spacing: 16.0

Major Lines every Nth Grid Line: 8

Perspective View Grid Extent: 24

Inhibit Grid Subdivision Below Grid Spacing

Inhibit Perspective View Grid Resize

Dynamic Update

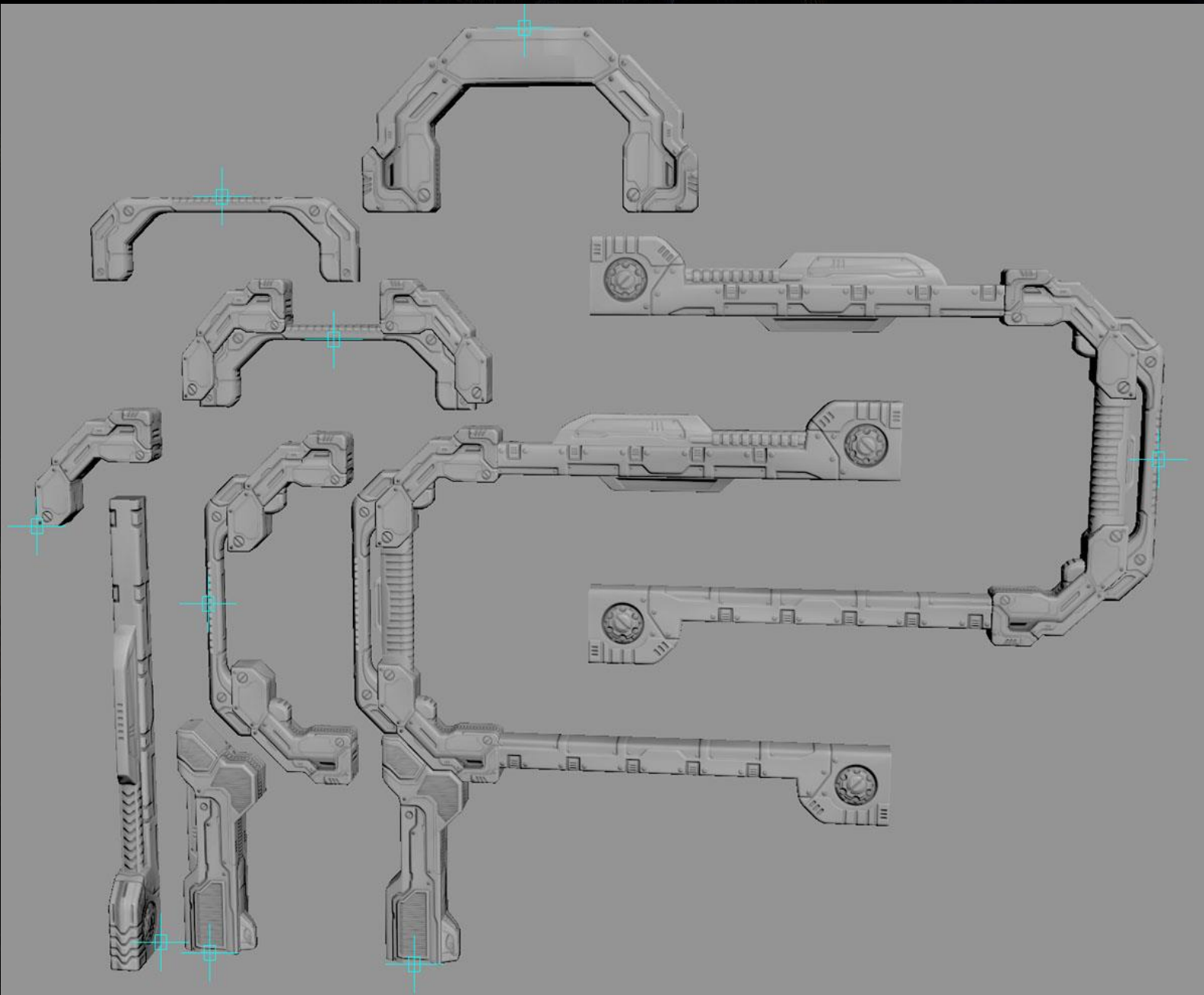
Active Viewport All Viewports

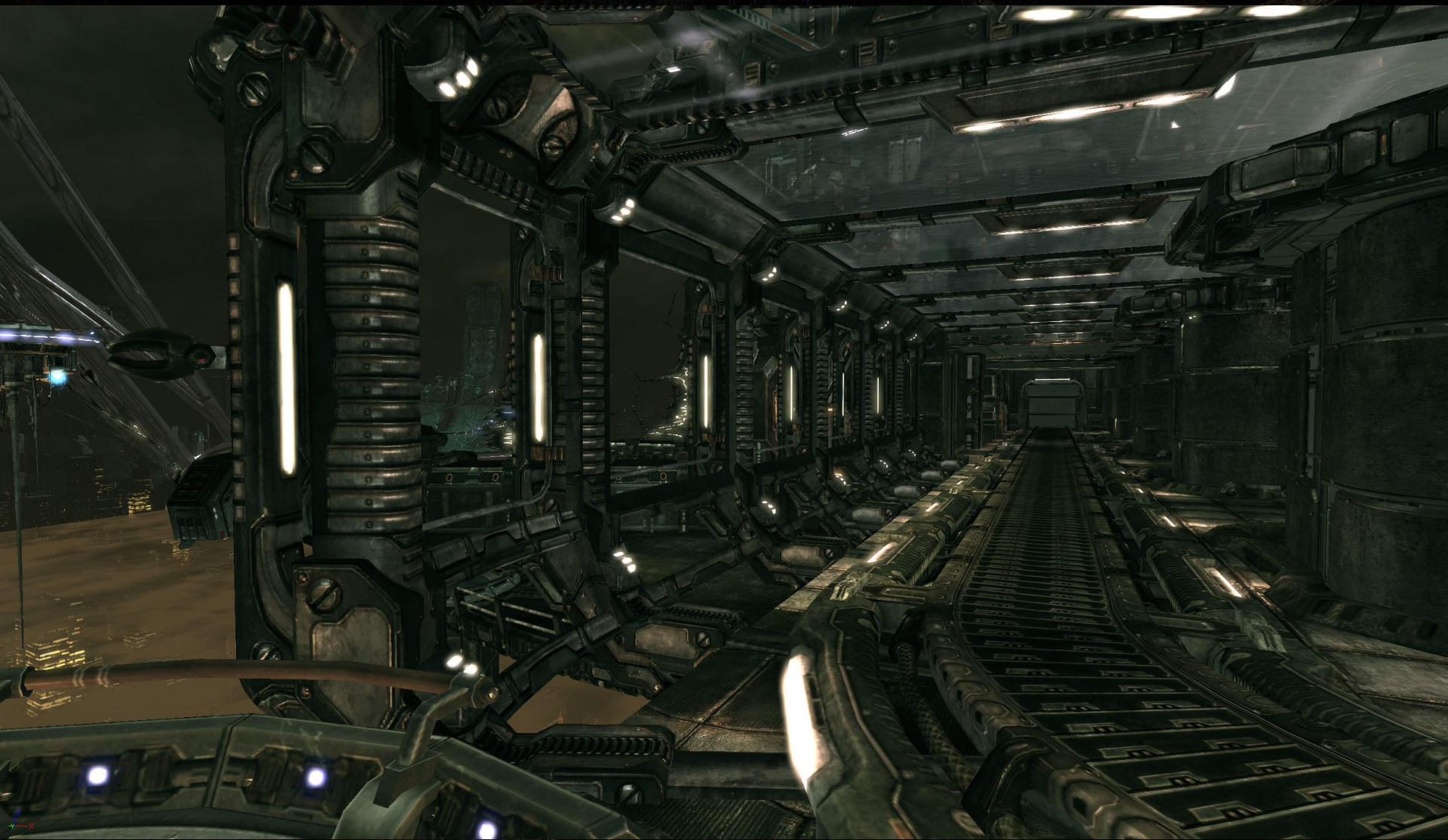
S_COG_Hospital_BrickWall01

Use Pivot Points

WORLD-SPACE MODIFIERS

- Camera Map (WSM)
- Displace Mesh (WSM)
- Hair and Fur (WSM)
- MapScaler (WSM)
- PathDeform (WSM)
- Point Cache (WSM)
- Subdivide (WSM)
- Surface Mapper (WSM)





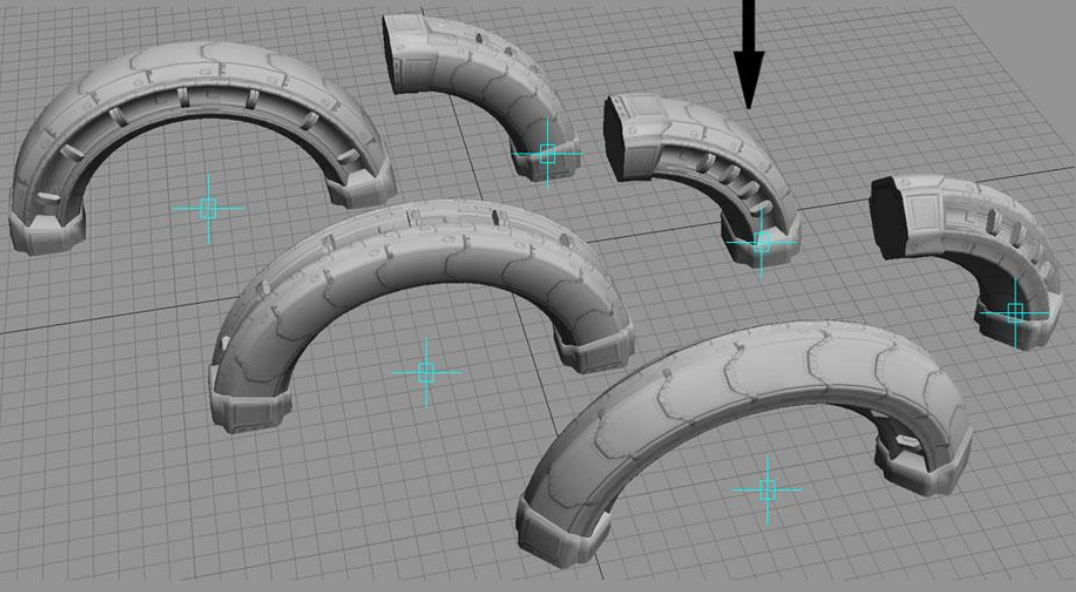
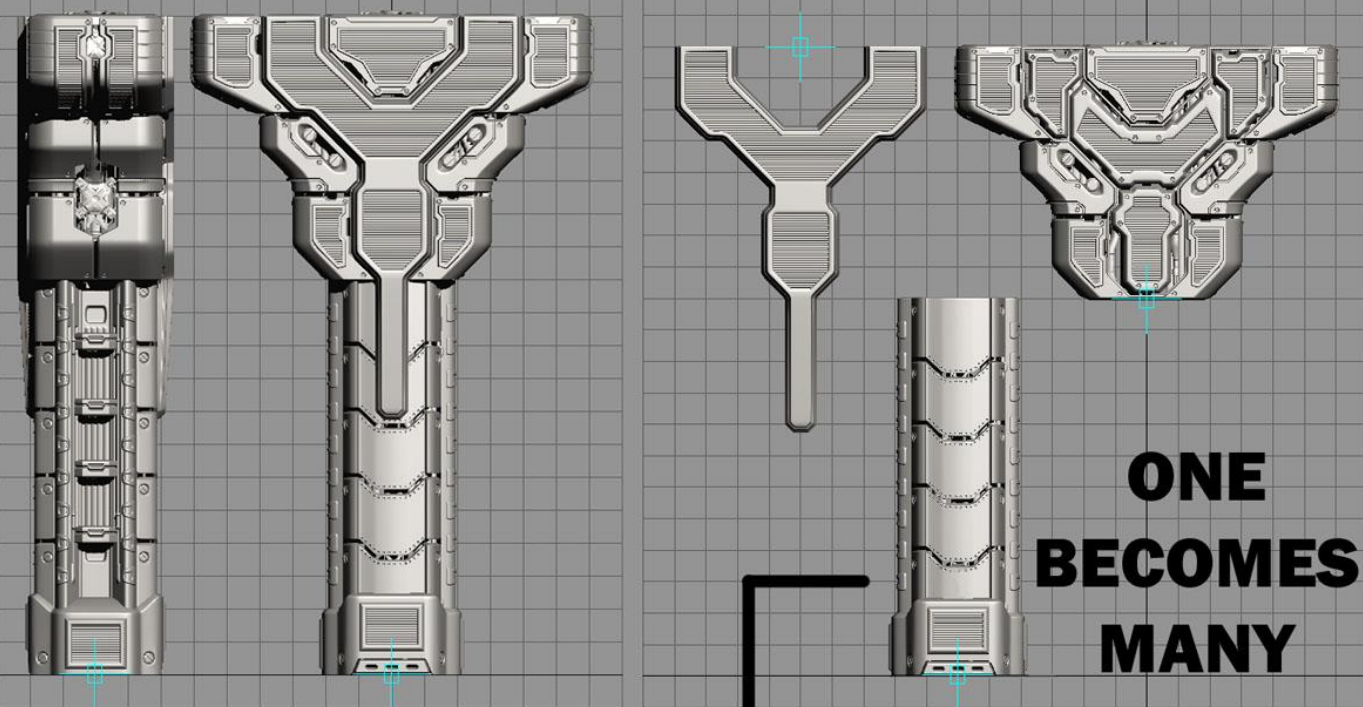


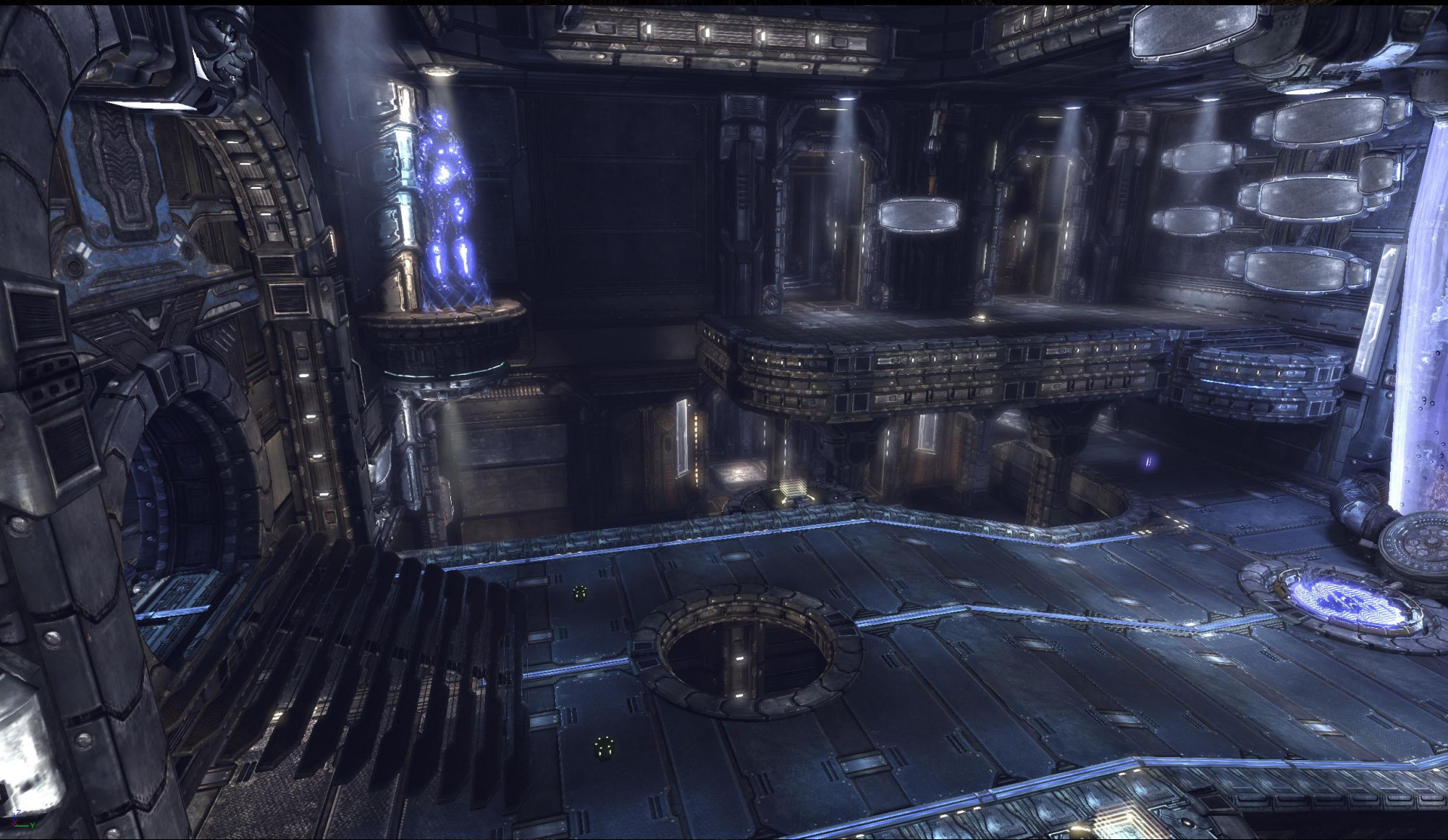
Is a rectangle also a half circle?

- **Complex designs - complex UVW's**
- **Simpler shapes - more texture res**











Lessons learned?



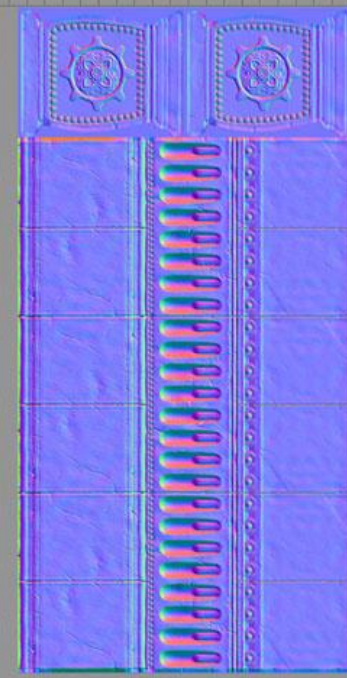
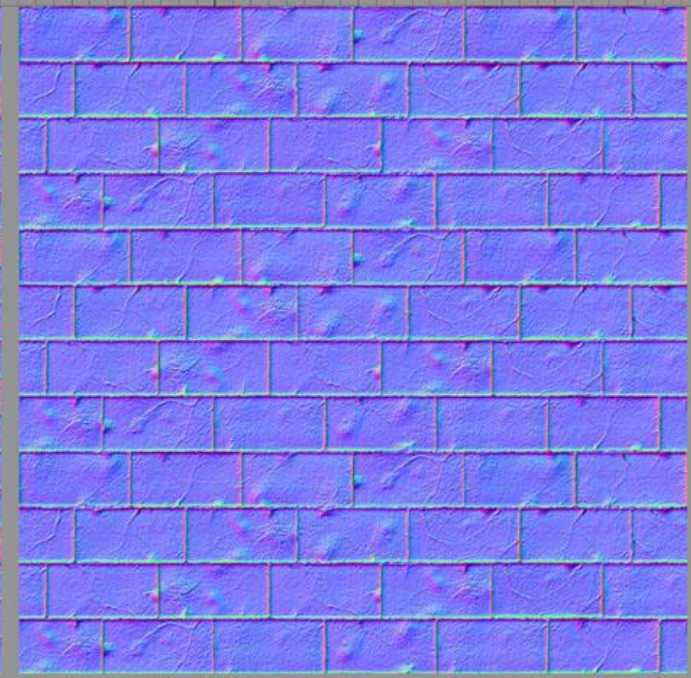
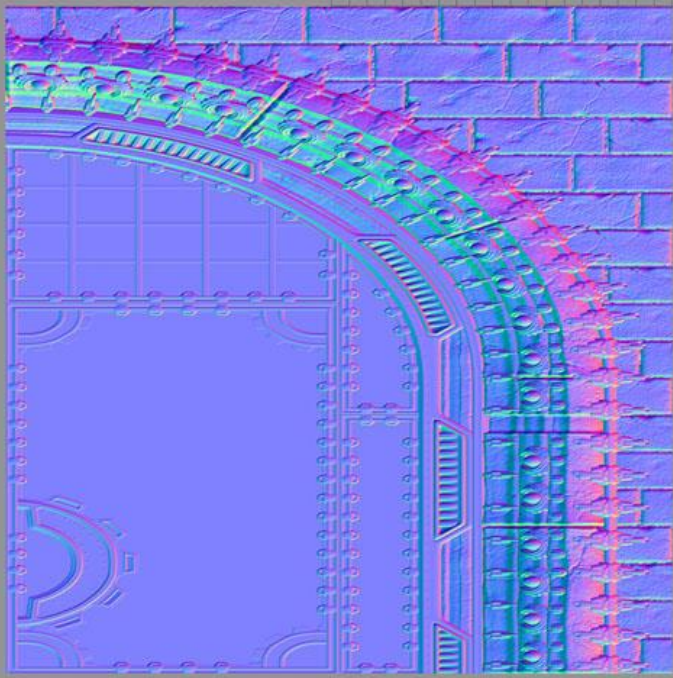
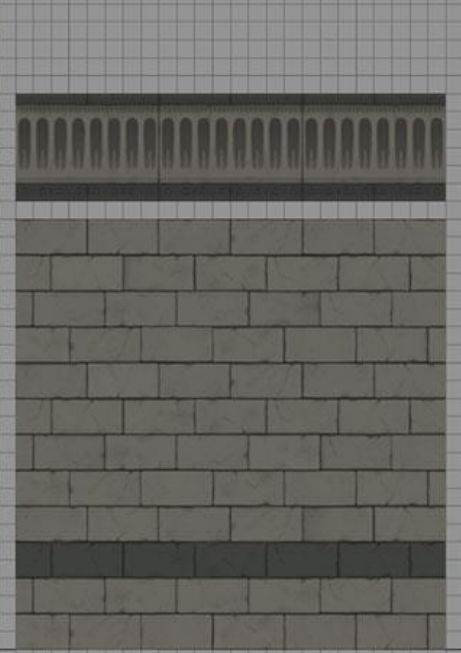
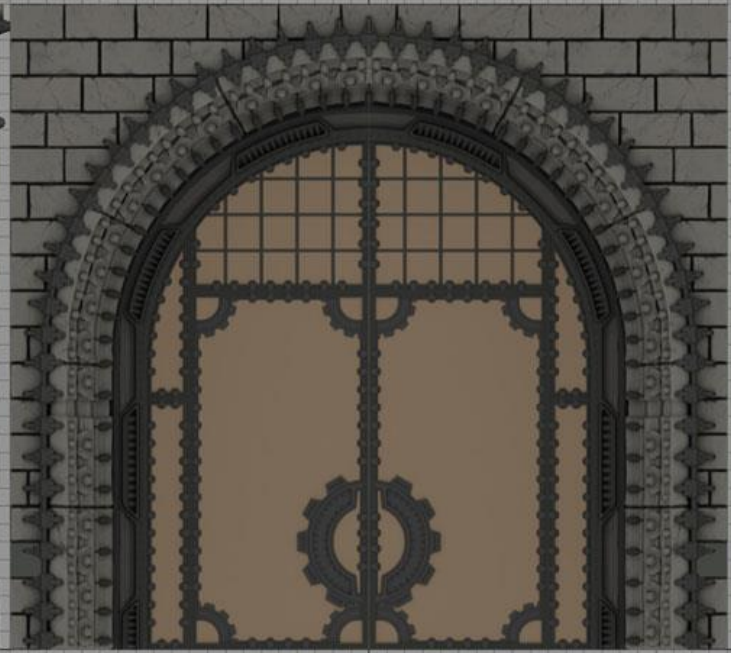
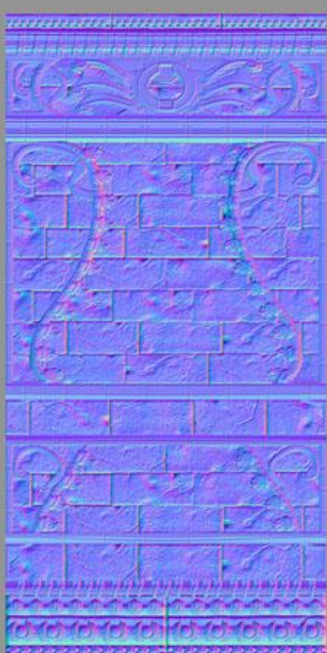
- Repetition of forms = authenticity
- Rate of production UP - Texture load DOWN
- Asset count

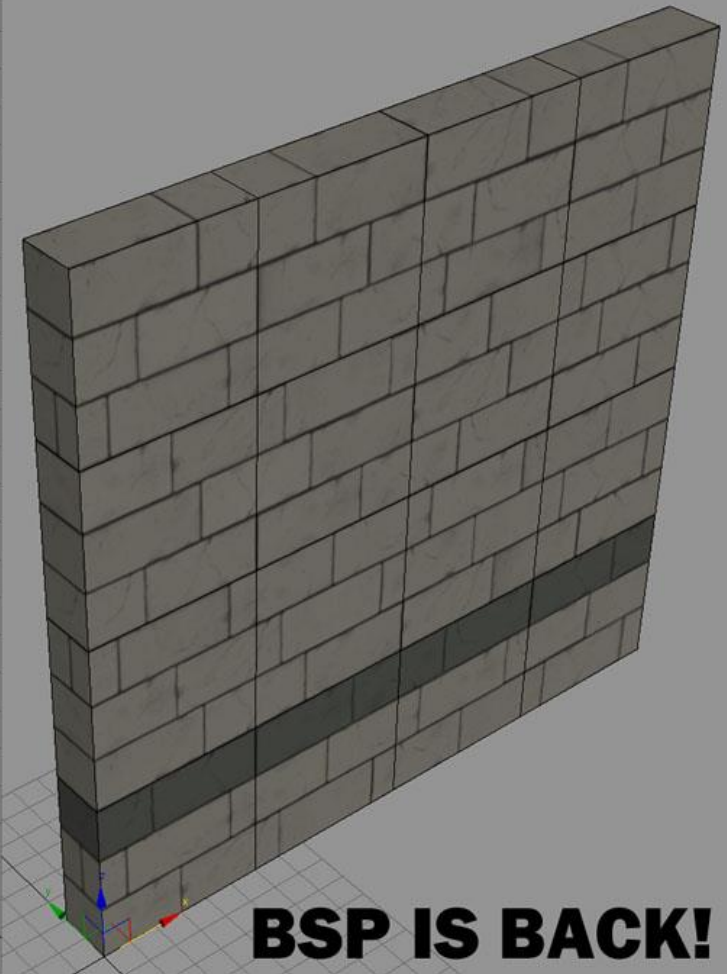
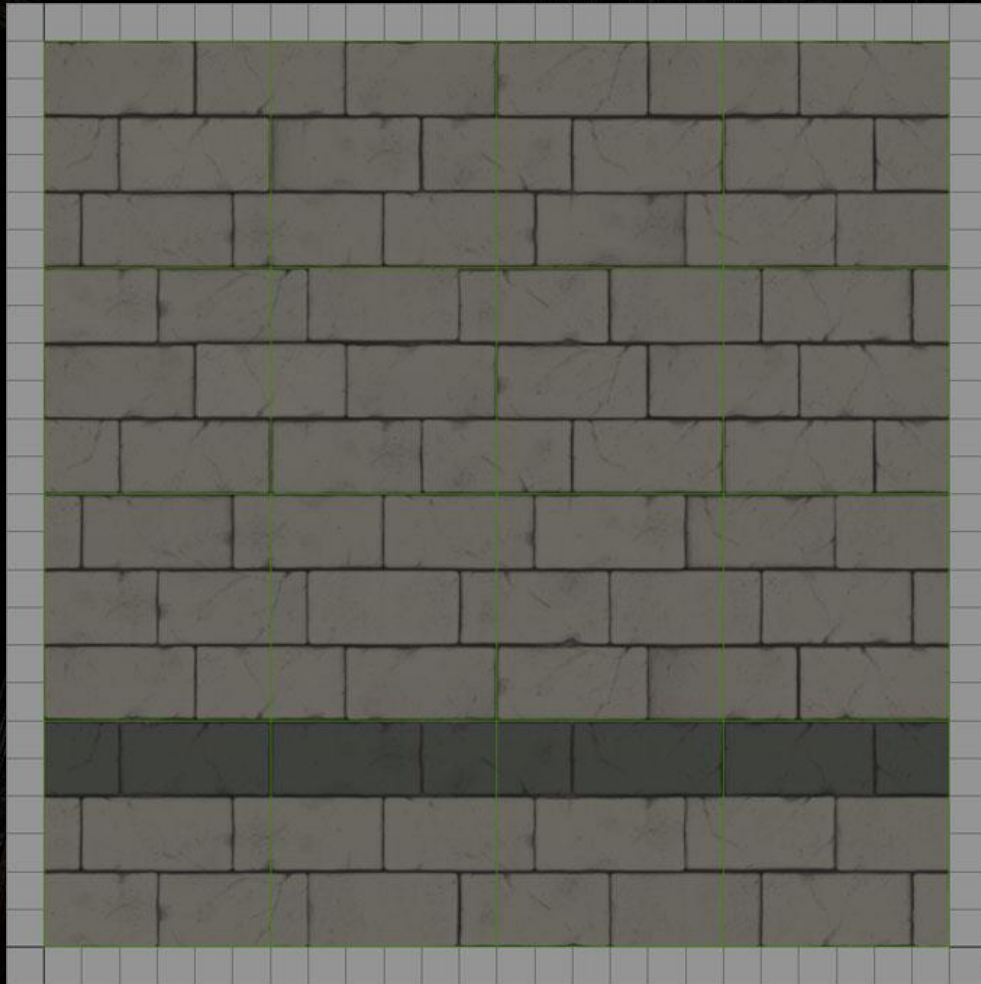
Taking off



- **Production of more meshes at once**
- **Simplified UVW's**
- **The return of BSP walls (sort of)**

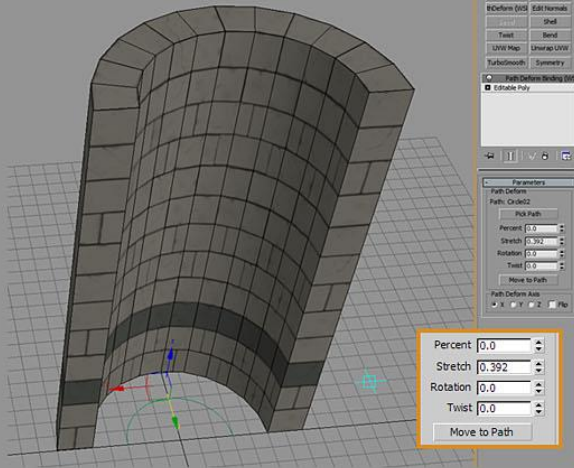




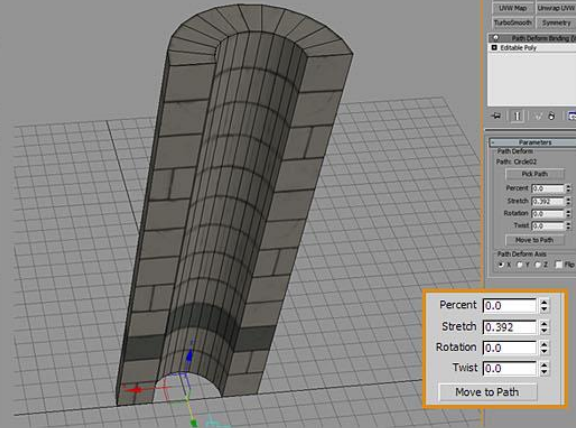


BSP IS BACK!

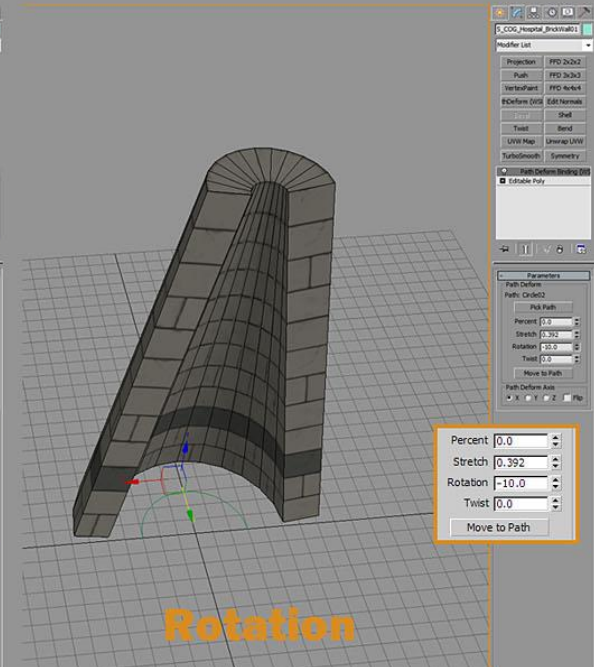
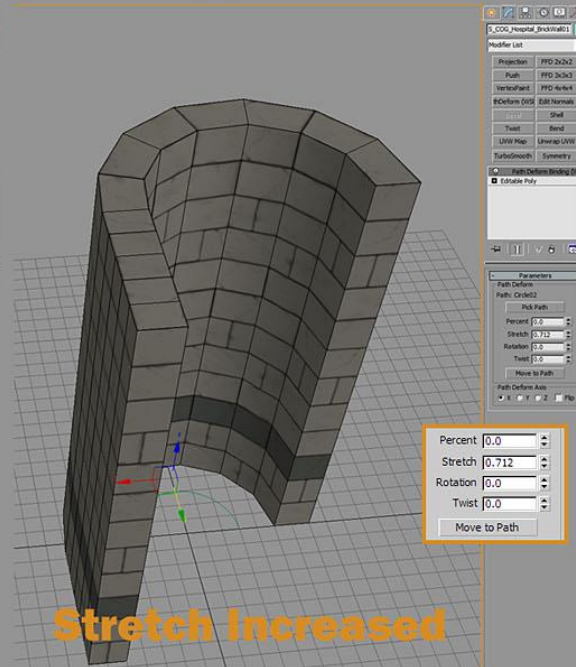
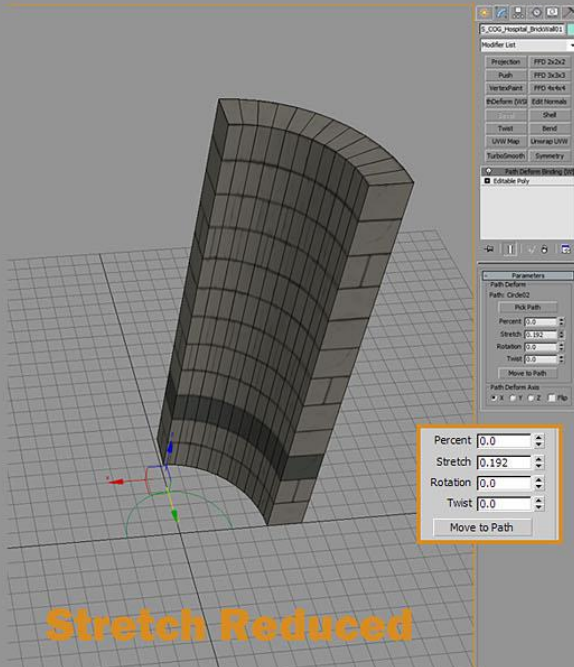
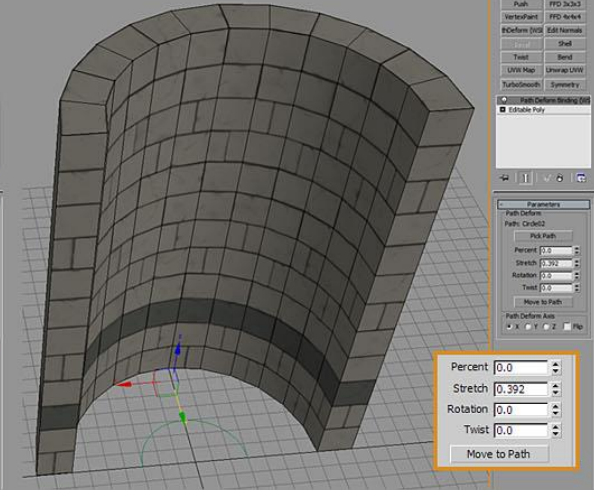
256 unit diameter



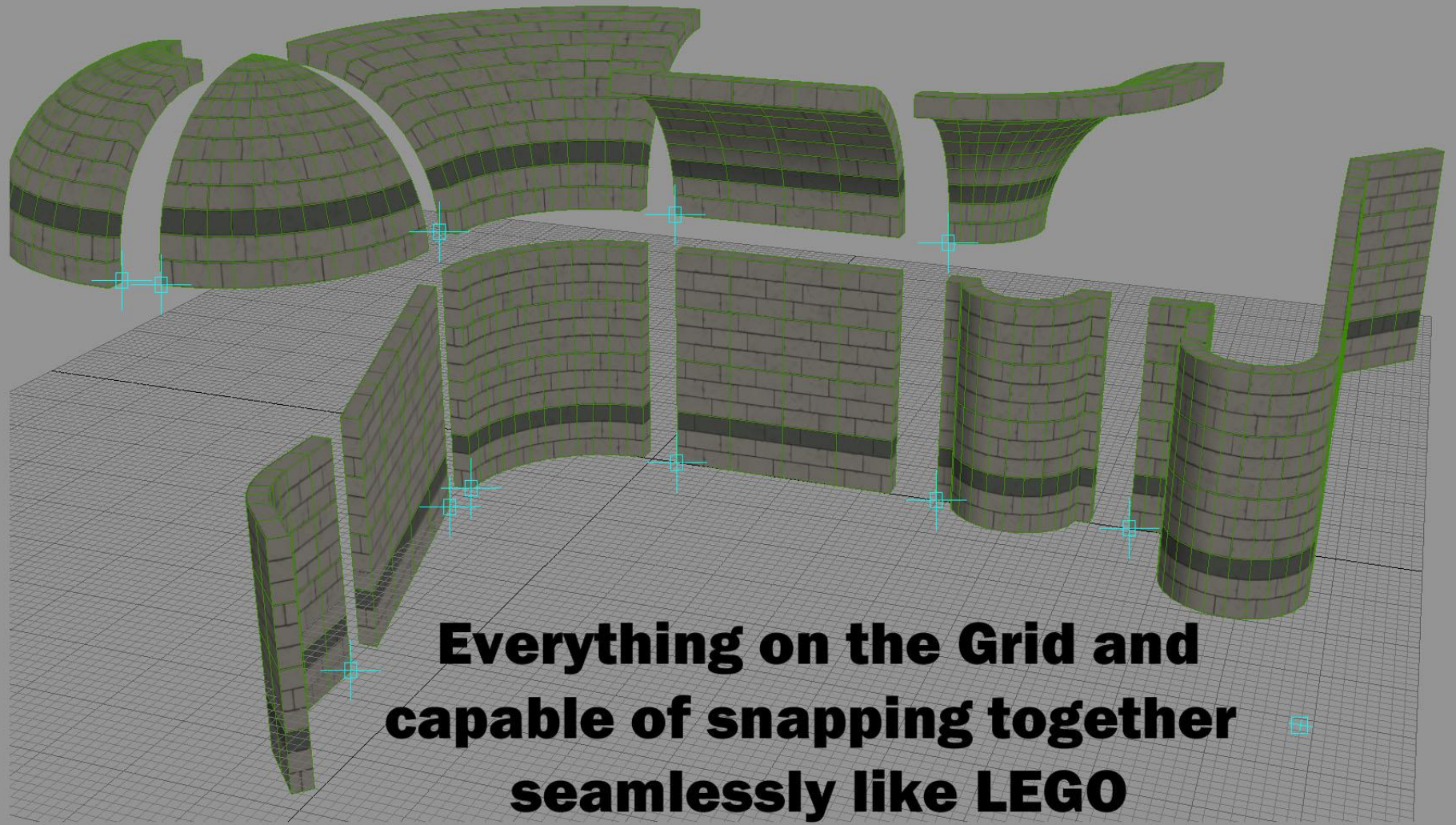
128 unit diameter



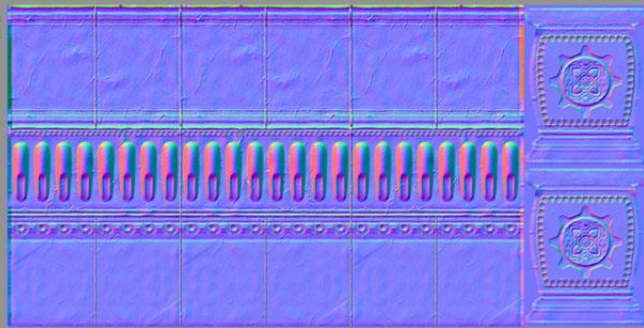
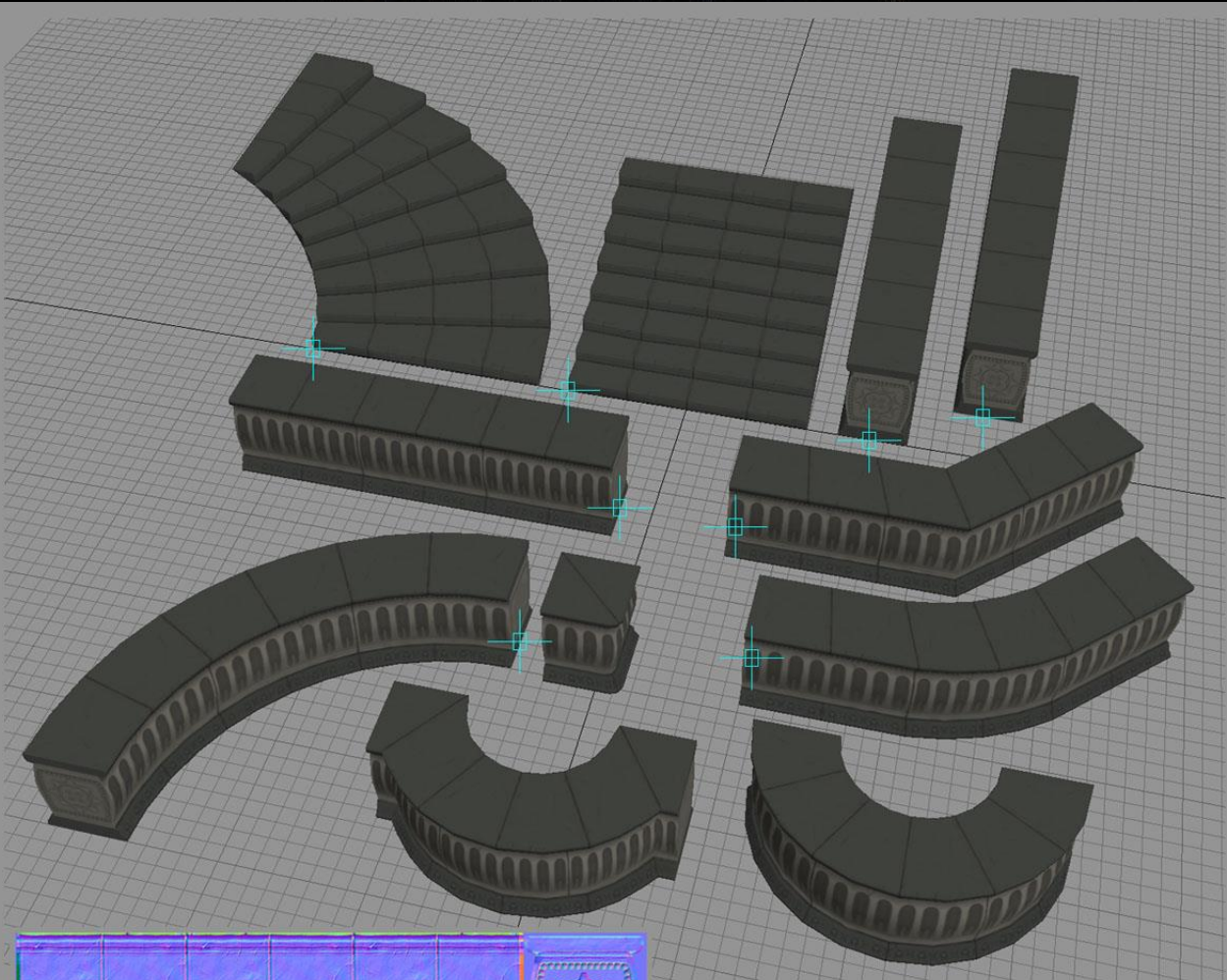
320 unit diameter



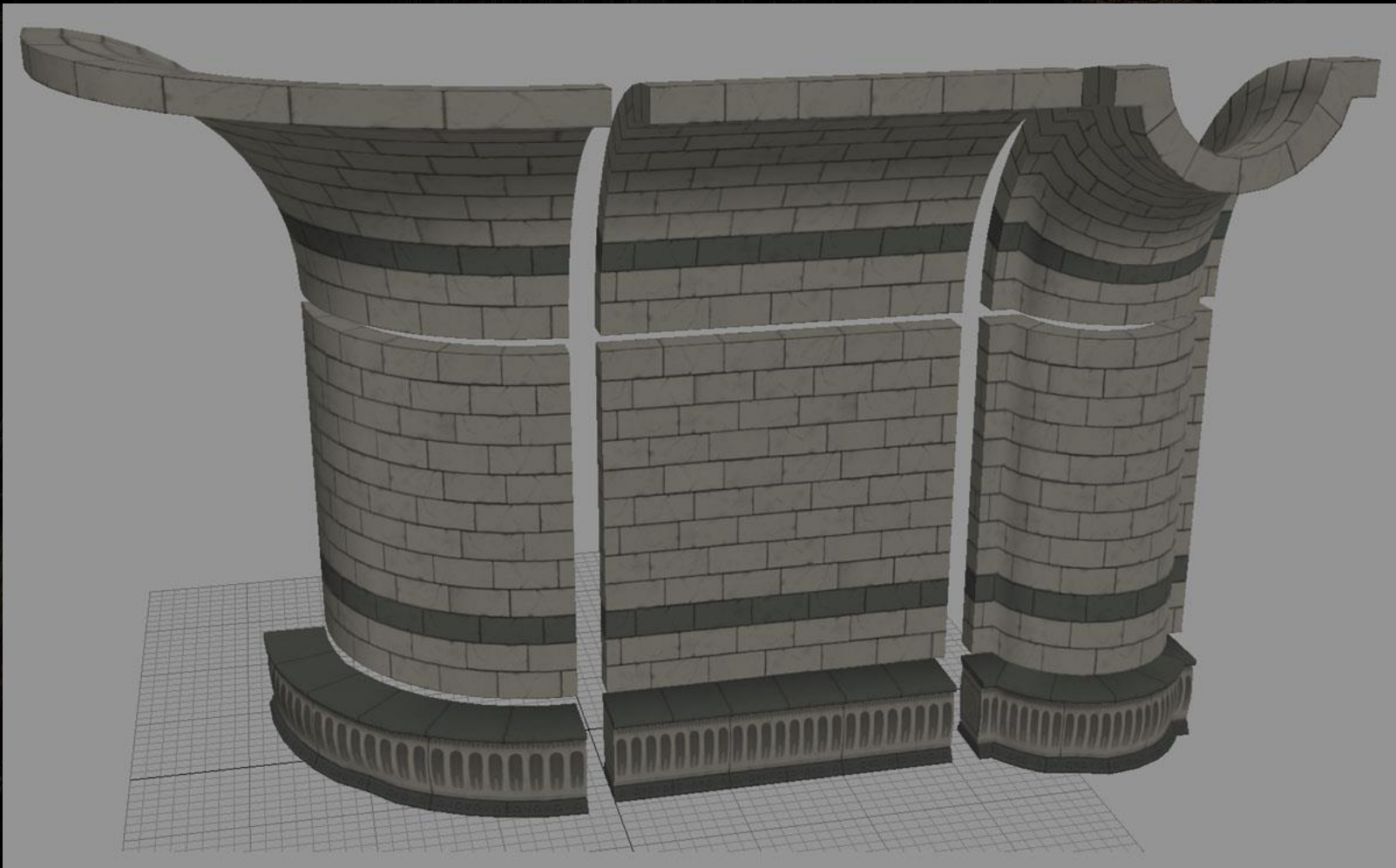
PATH DEFORMATION AROUND A HALF CIRCLE SPLINE



**Everything on the Grid and
capable of snapping together
seamlessly like LEGO**



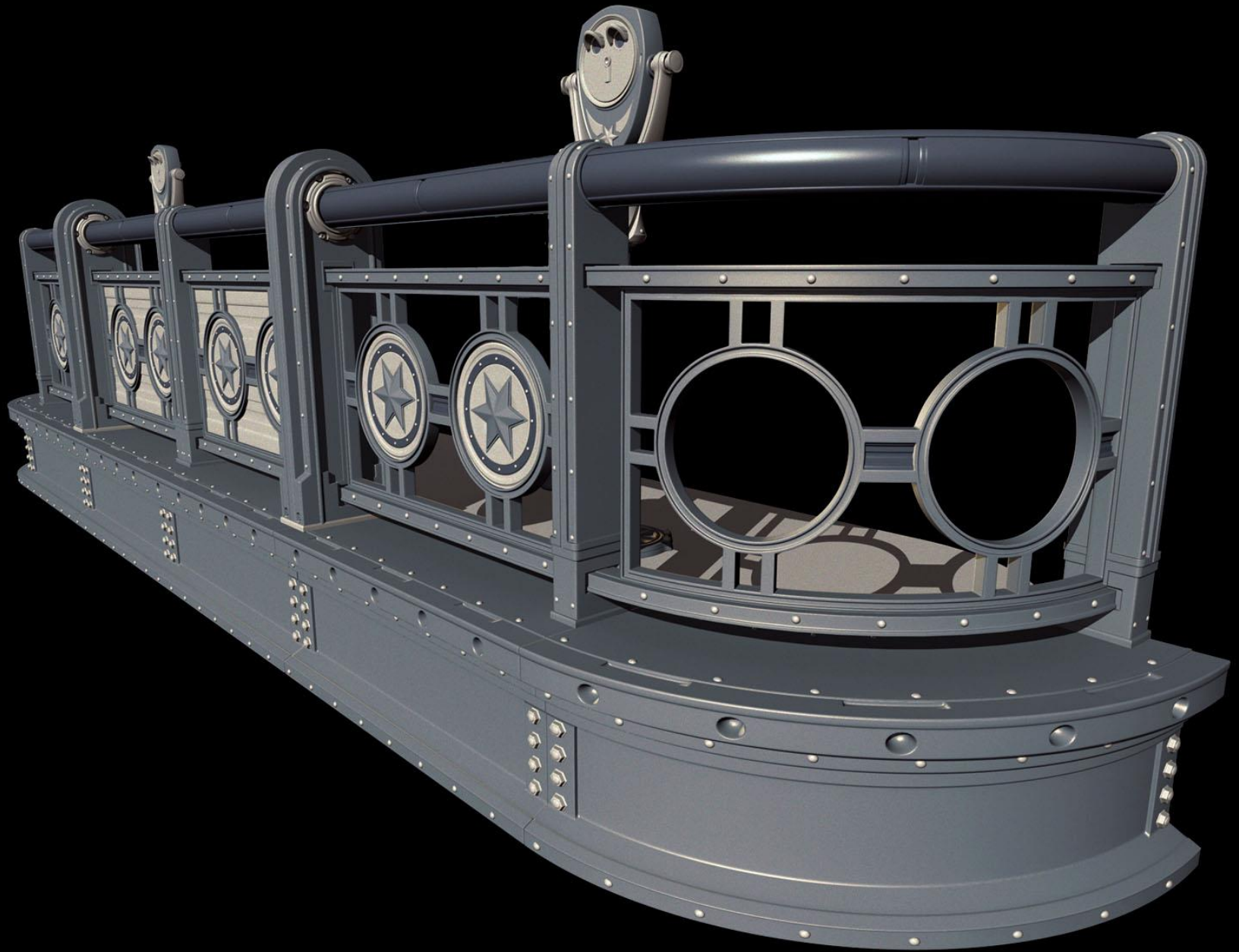
Simple UVW Layouts support multiple forms



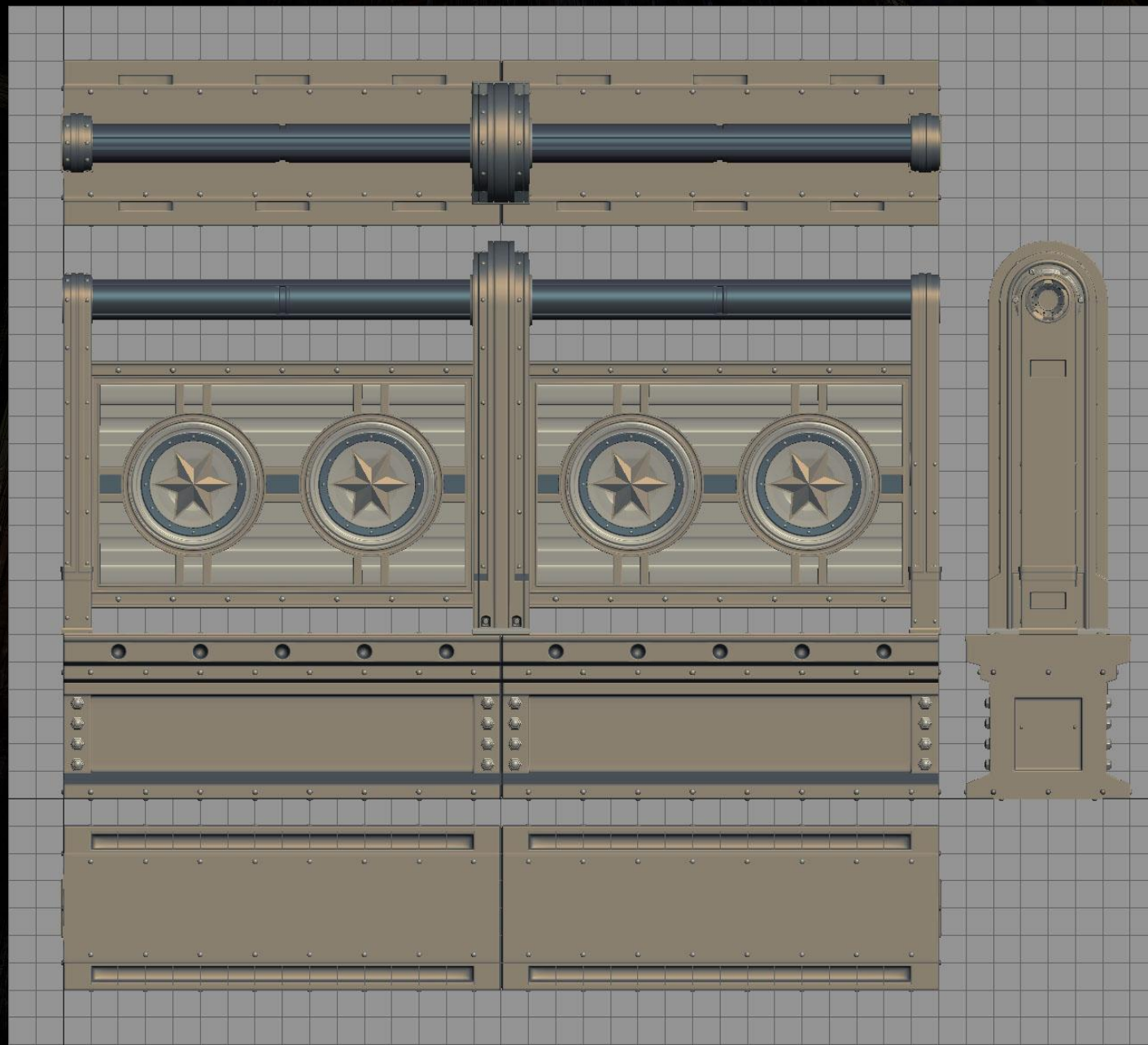
Gears 3 ambitions

- It has to be bigger!
- Planning ahead
- Robust asset creation

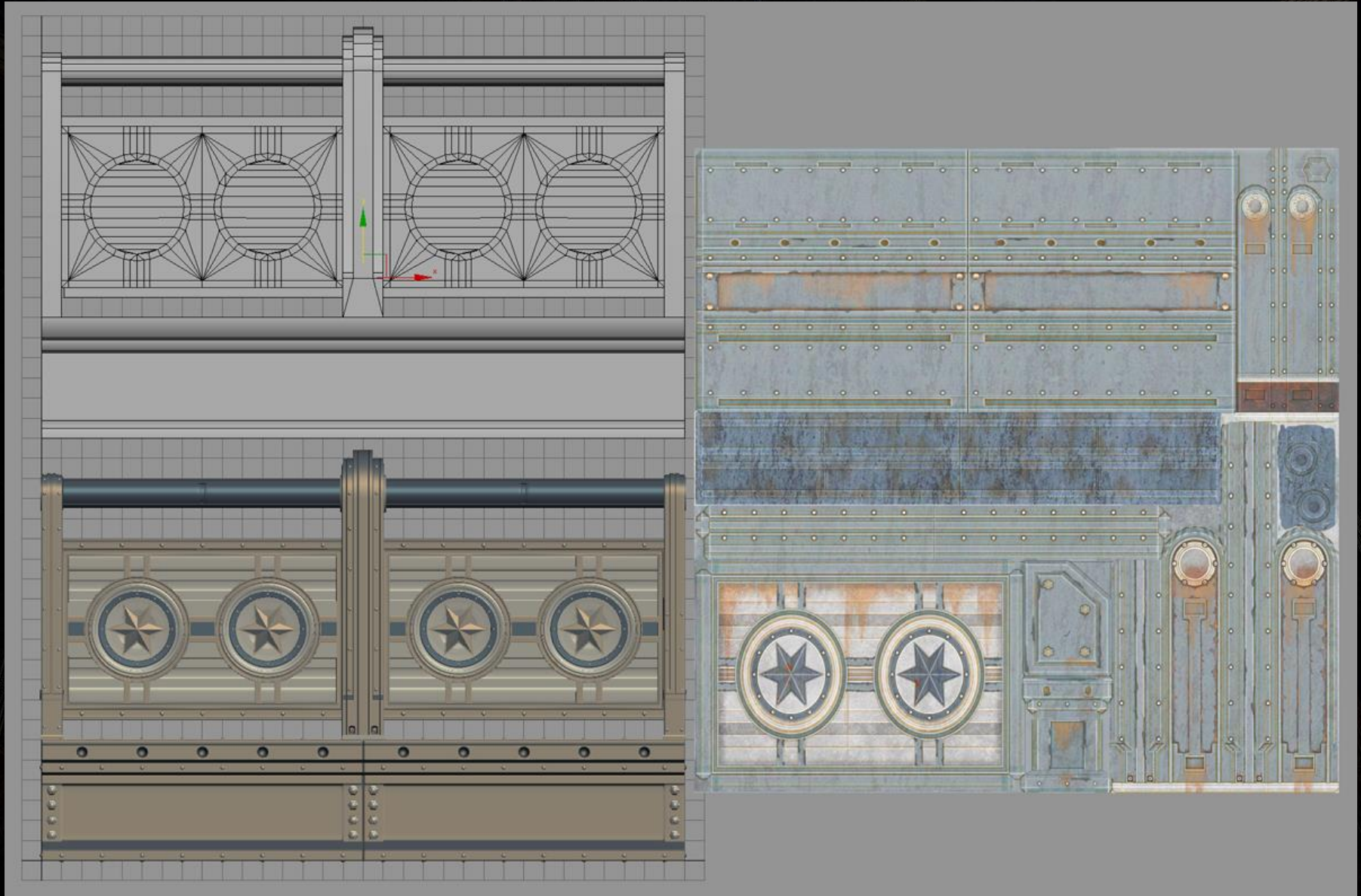


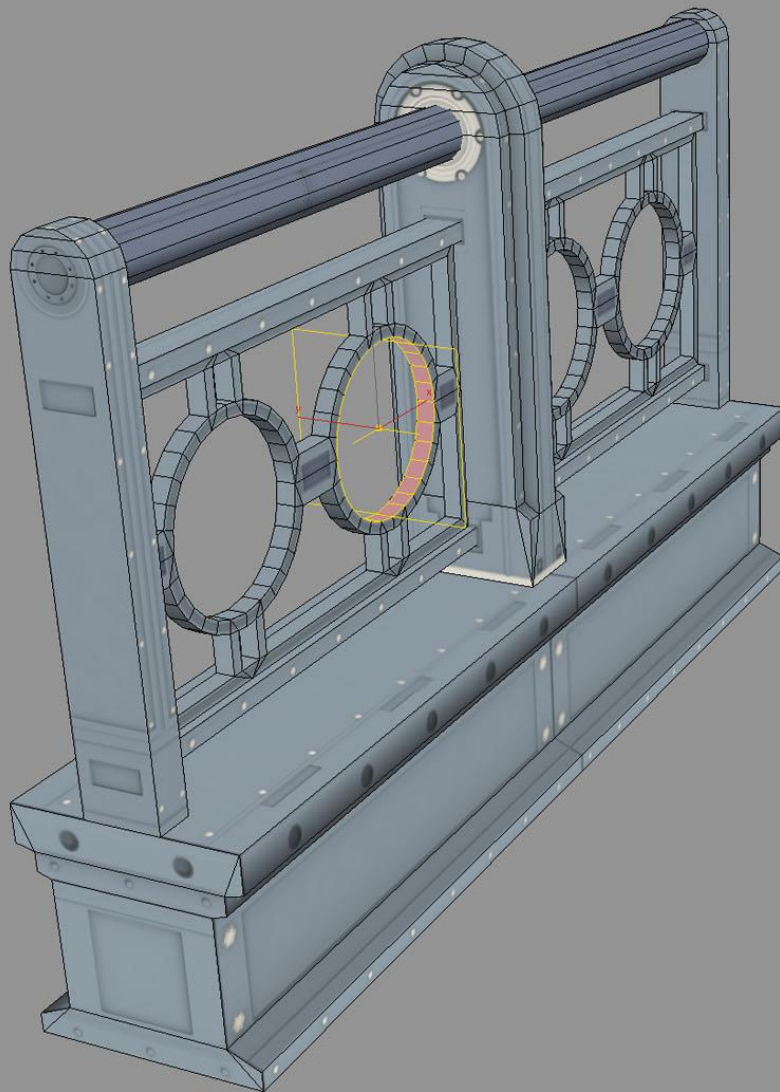


Becoming obsessive with the Grid, Trust it and it will help you

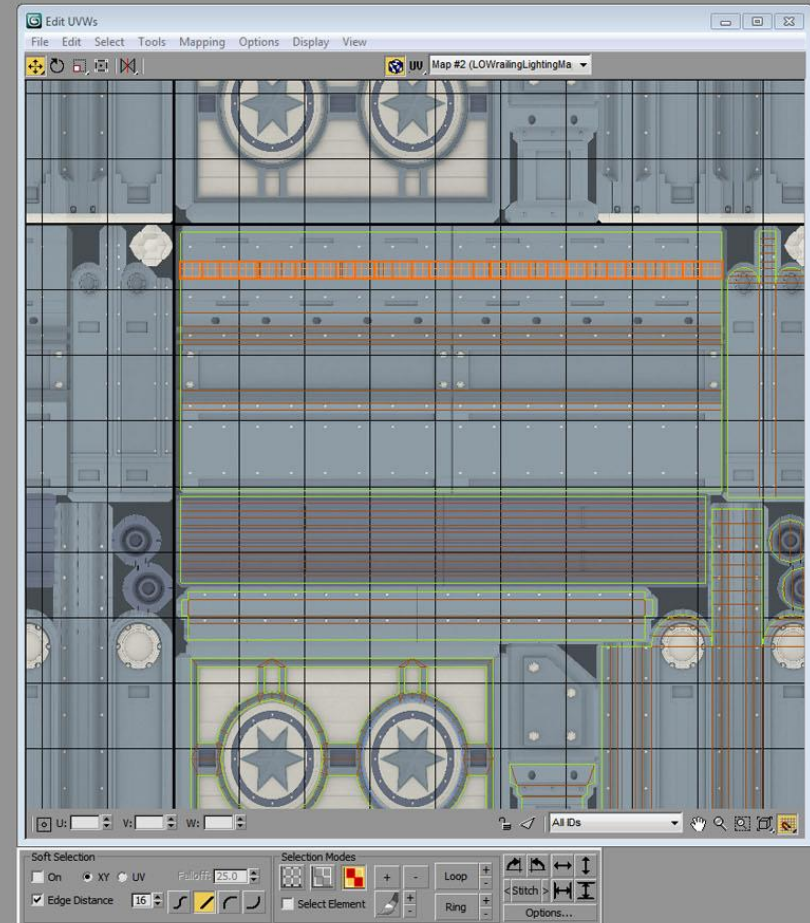


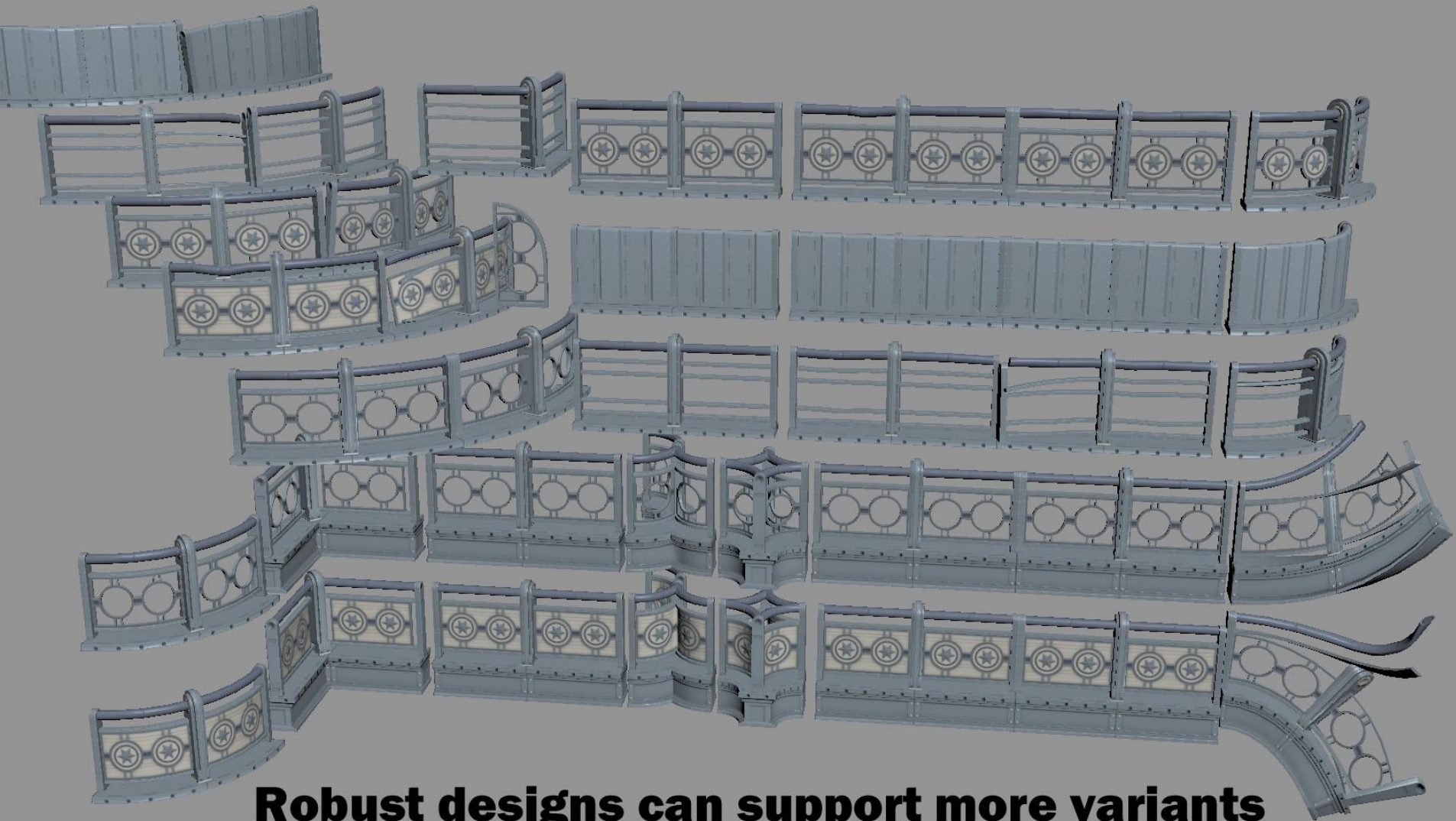
Processing is how we transfer from detailed meshes to simple ones





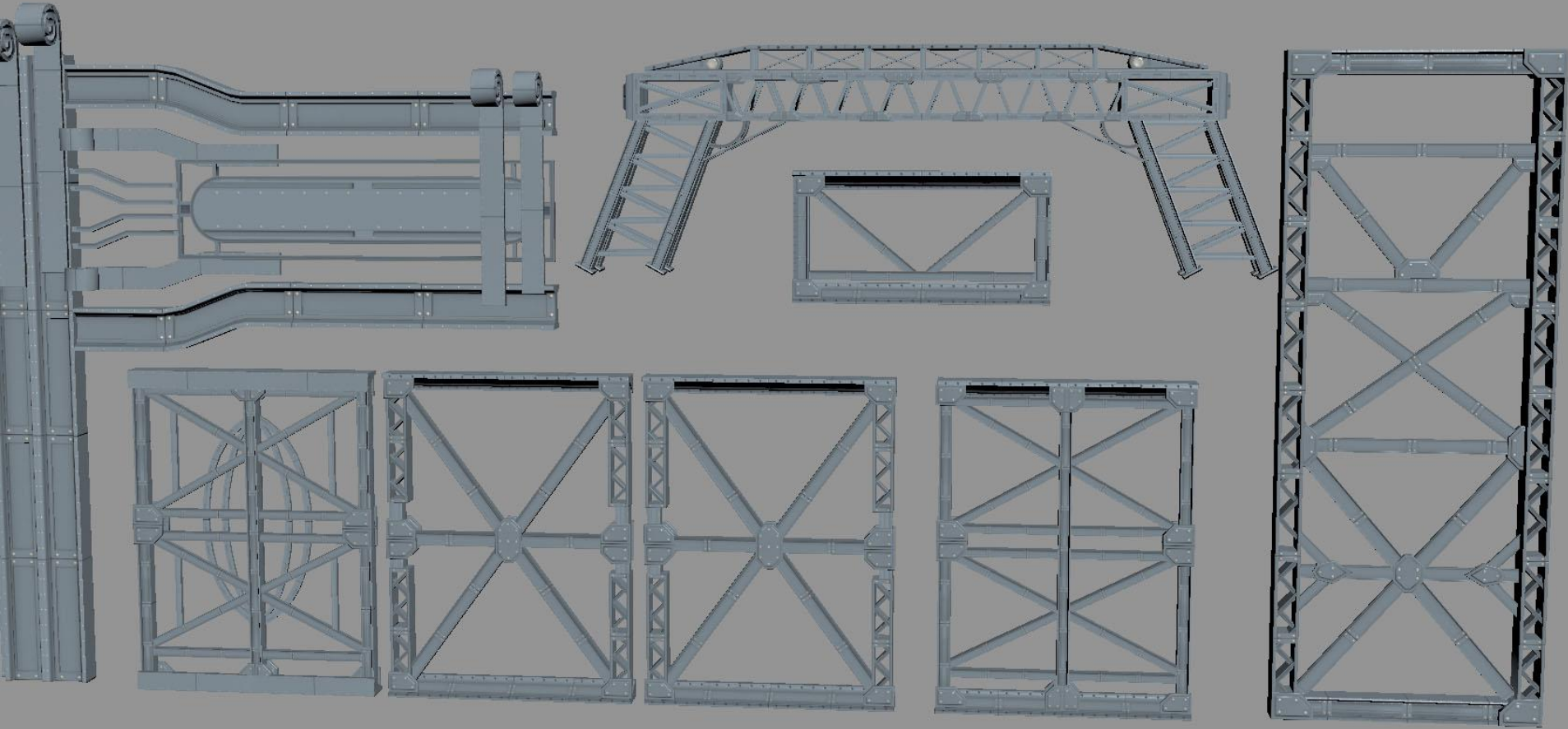
No need to assign dedicated texture space when we can assign part of the girder





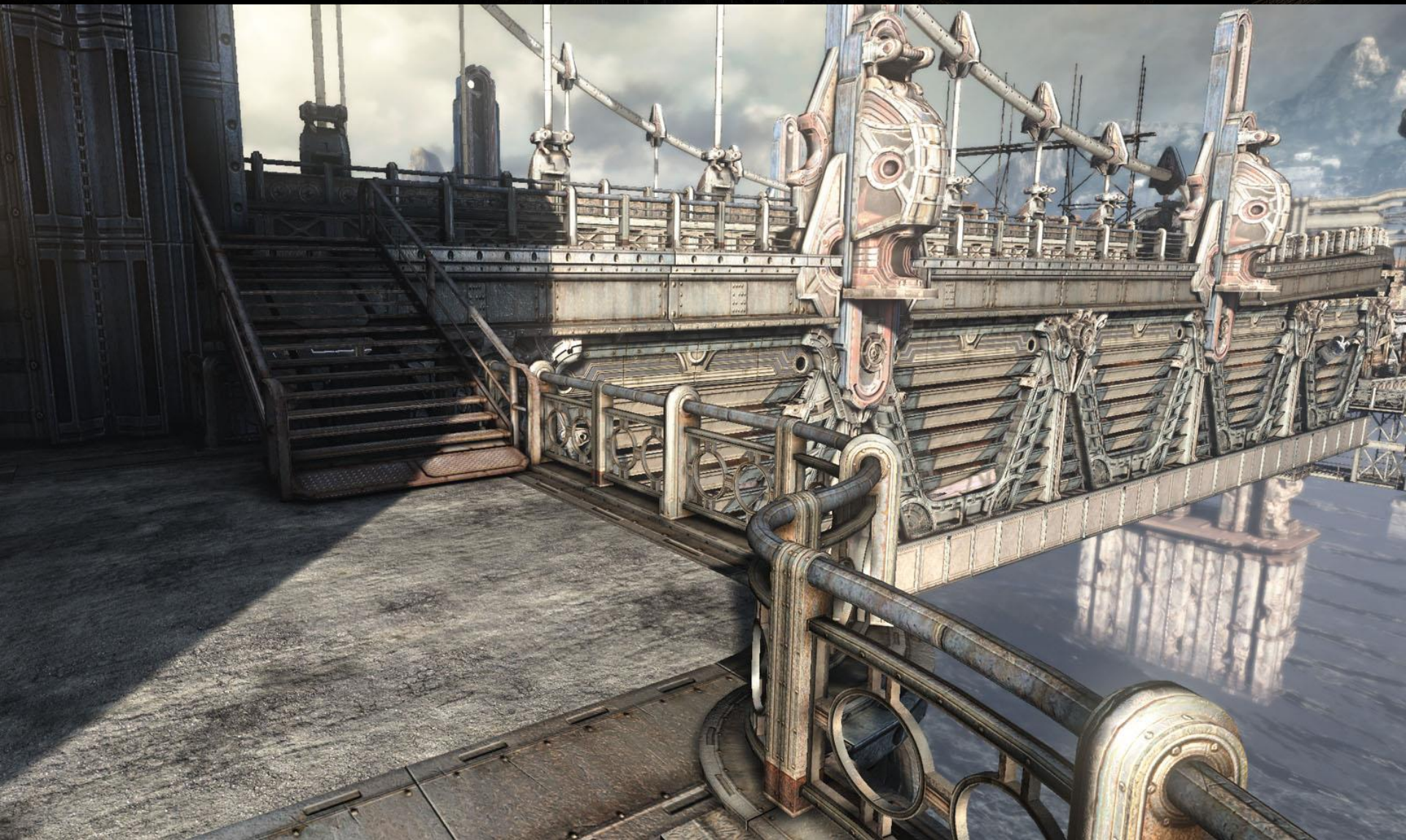
Robust designs can support more variants

Efficient UVW layout can support unplanned designs



You NEVER know for sure how the art will be used in game





Completing the mission

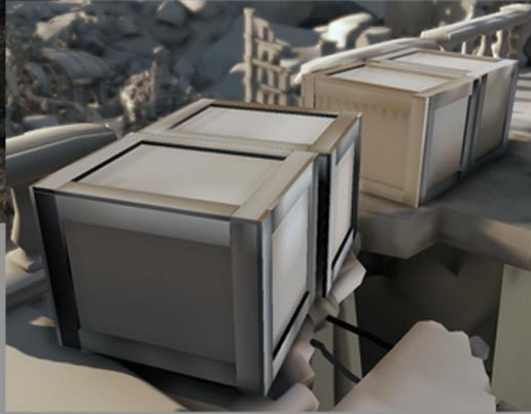
- Optimization
- Problem solving





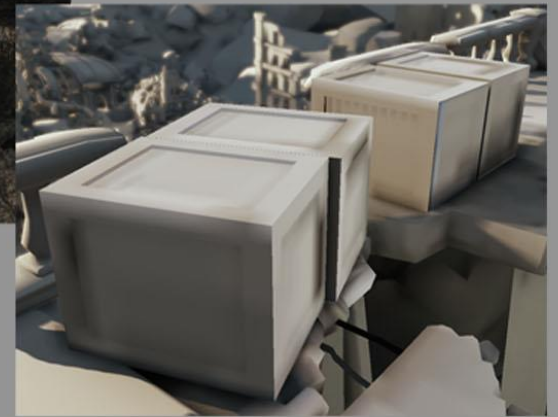
Original mesh

Asset lights poorly

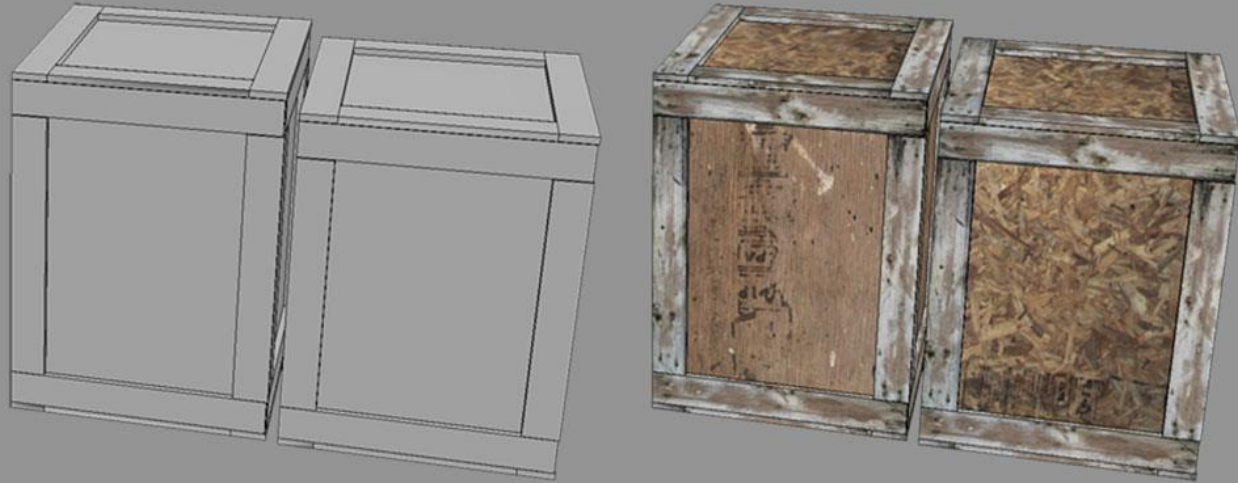


New mesh

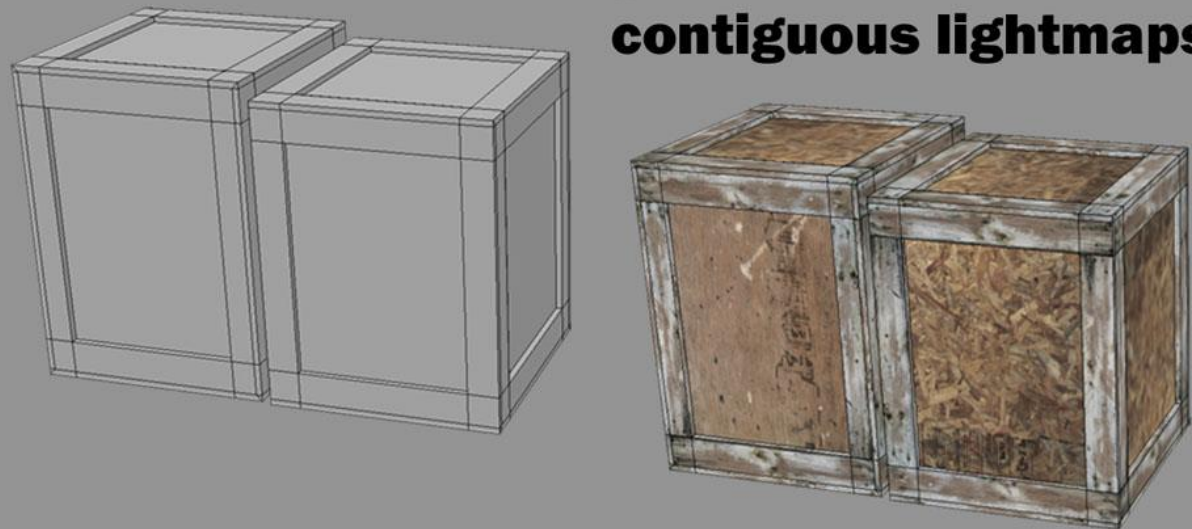
Asset lights properly



Original mesh has floating separate elements

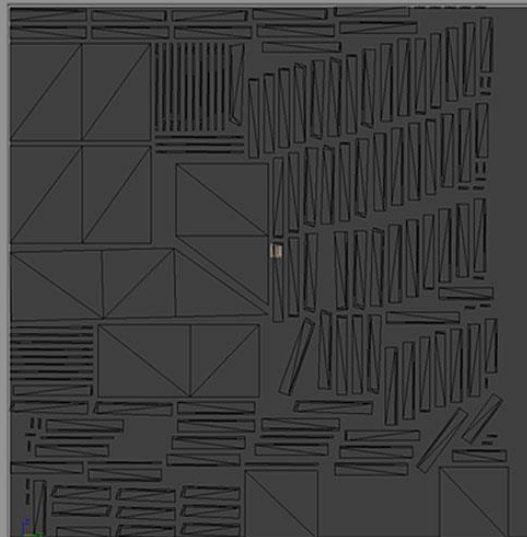


New mesh is 2 contiguous blocks to allow contiguous lightmaps

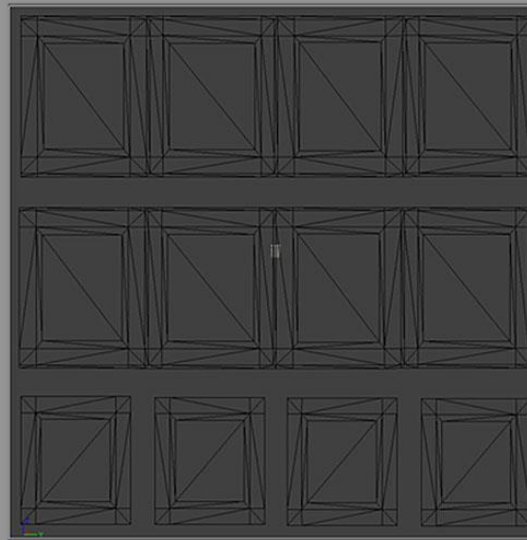


Fragmented Lightmaps = BAD

Triangles: 600
Vertices: 1204
UV Channels: 2
Approx Size: 307x159x207



Triangles: 472
Vertices: 800
UV Channels: 2
Approx Size: 306x159x207



Fragmented Lightmaps = GOOD

Boring to Look , but still the most critical part of the work



Simple forms and light tones lets you focus on darks



Dark tones set to be color coded in-game



Summary

- **Think Ahead and plan it out**
- **The GRID is your friend**
- **It's not about being a great modeler
its about being a great problem solver**
- **Ensure Adaptability, you need to take requests**
- **You have to love it enough to make others love it**



That's the end

Thanks for listening

Kevin.Johnstone@epicgames.com

www.kevinjohnstone.com