

<https://www.youtube.com/watch?v=Jbwsf150yps>

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2013 trailer



First step of bringing a character to life is the concepting phase.

The concept artist will work close to art direction and gameplay.

The character artist will keep an eye on the iterations of the concept, to get an heads up on what technically might be needed later on (hair, cloth).

The artist will also consult the conceper if certain aspects of a design wouldn't work well with movement or deformation.

Here is an example of a story characters concept sheet.



Contains break down of certain important parts (the harness, helmet), also material references from photos that the concept artist intends the final asset to have.



As you can see a lot of concept art was created, and these are only the final approved ones.

There were a lot more iterations and variations of every single character seen here.



As a rule of thumb, the more important a character a character is in the game the more iterating goes in to the design.

Marius the main character being a good example of this.

Reference Images

- Materials
- Construction techniques
- Wear and tear



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Once the concept is approved we would gather real life references to get a better understanding on how things were built and what materials was used in real life.

We ended up with a huge database with mostly pictures from the internet, the ones on this slide was taken by team members during a field trip.



The first step of creating the asset is the modeling of the whitebox.

Because the whitebox will be the starting point for the rig all the parts that will be animated or physicalized should be represented. This includes smaller objects attached to jiggle bones and such.

The rigged character is then sent out to be tested by various departments (animation, gameplay), and iterated upon if needed.

The whitebox is not actually white, to help the lighting artists we give their material correct PBR values.

Since the whitebox is merely a placeholder as little time as possible should be spent on it, since it will be thrown away in the end.

Basemesh

- Base for sculpt
- Contains all objects
- UV mapped
- Up to 300k triangles



The basemesh is the beginning of creating the actual final asset. This mesh will typically be made using Maya a 3d modeling application

<https://www.youtube.com/watch?v=TTJ0tzZQaVs>

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This is actually not the model used in the game, this a model made in order to start on the high polygon count of the model in a different application called zbrush. Zbrush is a digital sculpting program. Basically it is like working with digital clay.

For optimal model creation in Zbrush an even polygon distribution is important.

Usually this model was not sent to other departments for testing, but there were exceptions as you will see in the coming slides.



In this case the praetorian basemesh was used for testing materials on by the shader programmers.



Basemeshes would also sometimes be used for reviewing hero assets, keeping the directors confident things were heading in the right direction.

The sculpting techniques varied between artists, and no strict way of working was necessary.

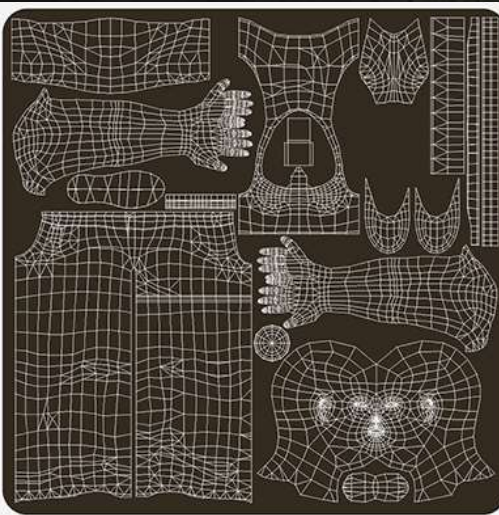
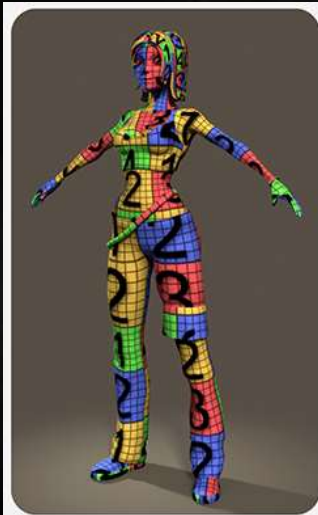
In general the artist tended to work in a very non destructive way using layers.

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This model also has Uvs made for it – not for the final texturing but just to be able to do some tricks in zbrush to decrease time required to sculpt all the details on the character.



UV map

A 2D representation of a 3D mesh. The U-direction and V-direction correlate to a position on a 3d mesh (x,y,z). Used for applying textures to your 3d asset.



Remember UVs!?!

<https://www.youtube.com/watch?v=iGeBPCi6ZtU>

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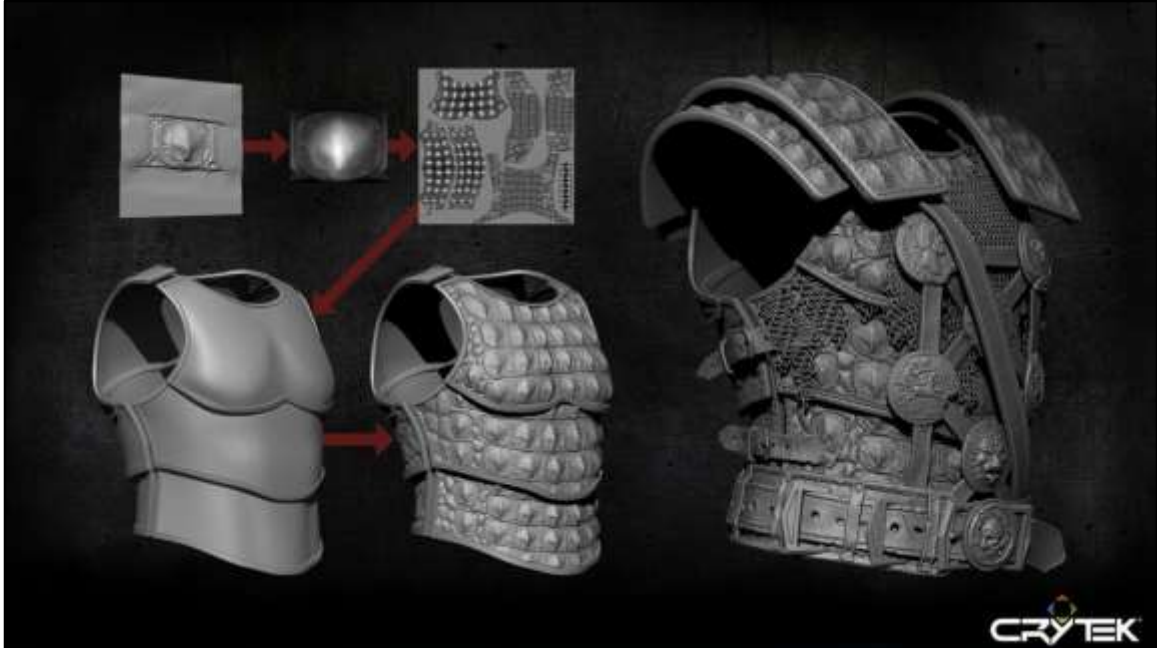


Here is what one of the high res zbrush models would look like

To save time on sculpting small details as those seen on the cloth and armor pieces they artist used procedural techniques.

This techniques are possible because this model is Uved map.

Take the case of Damocles crocodile harness to explain these technqiues .



Character artist sculpt a single one of these scales. From this they would create a displacement map. A displacement map is simply a black and white image where the color represented the distance from the surface the detail is at. So each pixel's value is a distance that pixel should move from it's current position.

In photoshop the displacement map is just copied and pasted all over the Uvs. This 2d representation of the 3d asset.

Then once back in photoshop this displacement map can be used to actually displace the mesh creating lots of details pretty fast on this high poly mesh



Just another angle



cool fact – these high poly meshes 130 million polys/tris (remember the base mesh was around 300k). Do keep in mind still none of what is being made can work in game in it's current form.

This made it necessary to split the asset into multiple Zbrush files, each and every one with plenty of sub-objects.

The amount of polygons would vary a lot depending how the asset would be used, Oswald here being a cinematic character had in the end around 140k.

Low Poly

- Ranging from 40k to 160k
- Most characters have LODs
- Decimated model to build on
- Basemesh as a start



Lets talk about the low poly – finally something that could make it into game

The Zbrush mesh is put to it's lower subdivision and the topology is rebuilt to be within a game budget.



<https://www.youtube.com/watch?v=SI-iRIQuU4k>

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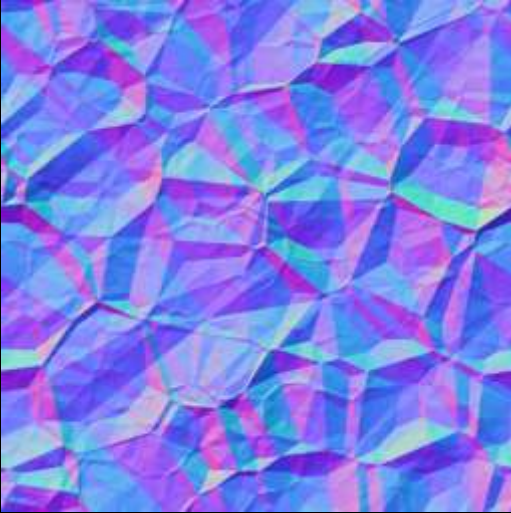
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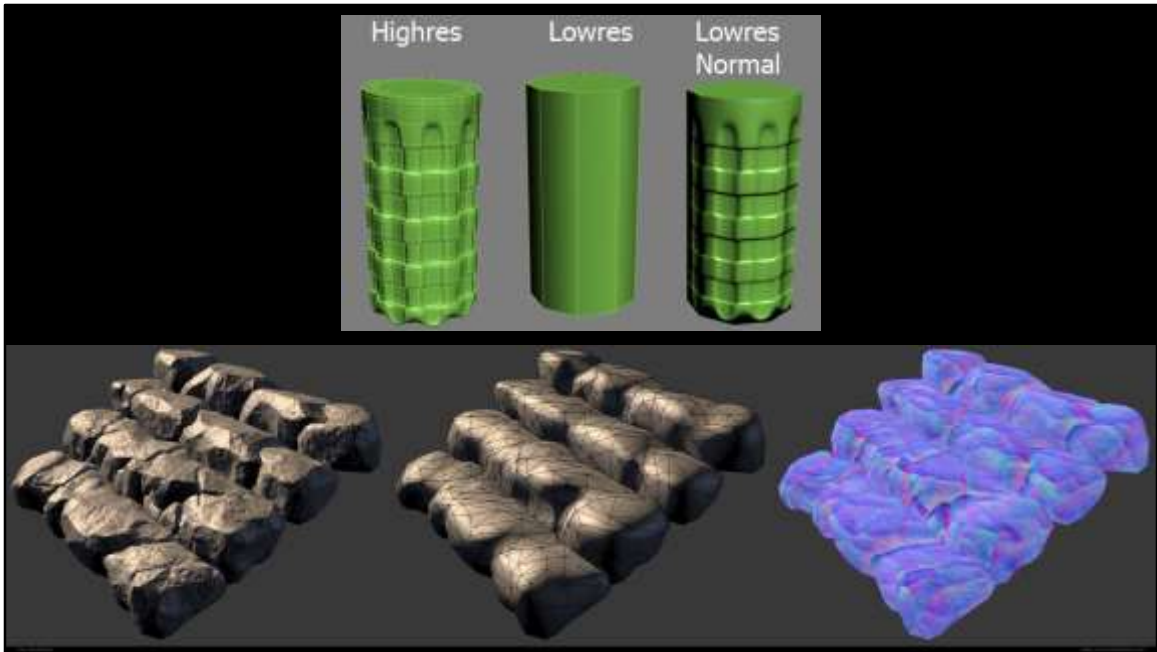
All the high rez details from that mesh are put into maps used to texture this low poly character and create the details

The most important of these maps is the normal map



Normal map

An image that stores a direction at each pixel. These directions are called normals. The red, green and blue channels of the image are used to control the direction of each pixel's normal. This creates the illusion of more detail allowing for a smaller vertex count on the mesh.



Special applications are used to create or “bake” these maps from the high res content onto the low res content

Substance is the most popular

X Normal is also pretty popular

<https://www.youtube.com/watch?v=pwTr0F0dxxk>

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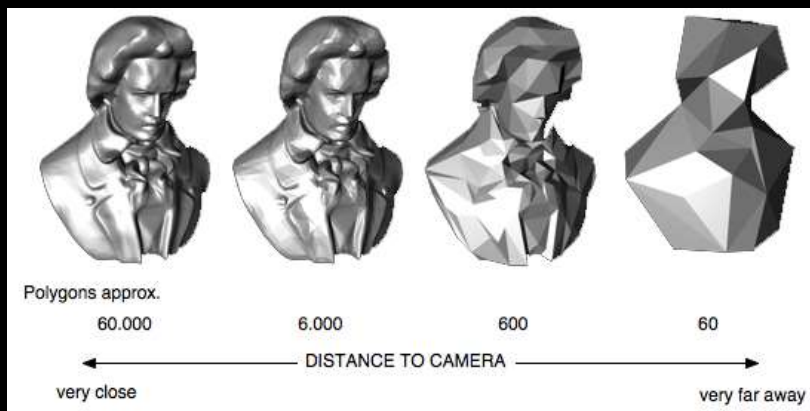


Poly count is very important for games – characters that are in situations with lots of other characters have to a lower poly count

For example the barbarian enemy had around 45k since he would appear in gameplay situations, sometimes with groups of enemies.

LODs are also very important for games

LODs was handled very much in the same way, most character had them, cinematic ones being the exception. Marius and Damocles didn't have LODs either being playable hero character and always fairly close to the camera.



Level-of-detail

This is a term that is talking about varying the amount of detail in an object depending on the distance from the object to the camera. Example: A car for a close-up would need to have every little detail modeled into it. Chrome, bumpers, body seams, door handles, etc. But that same car, as seen from a helicopter flying over a highway, might be able to be a simple cube with an image map applied to it.



Here you can see all the stages of the modeling process, from concept to finished ingame low poly.

Now lets take a look in to the texturing procedures we used.

One of the great advantages of texturing the high polygon version of the character is the we could be much more flexible with the in-game version.

Since we were developing a launch title the hardware was unknown and polygon budgets would change. Previous when we textured the in-game version of the model changing the topology or UV layout would mean we lost all the work we put into the textures, not in this case. Also LODs could get custom baked textures instead of using LODOs, giving us better quality and fewer draw calls.

Texturing

- High polygon model
- Physically based rendering
- Material standards
- Mask out materials



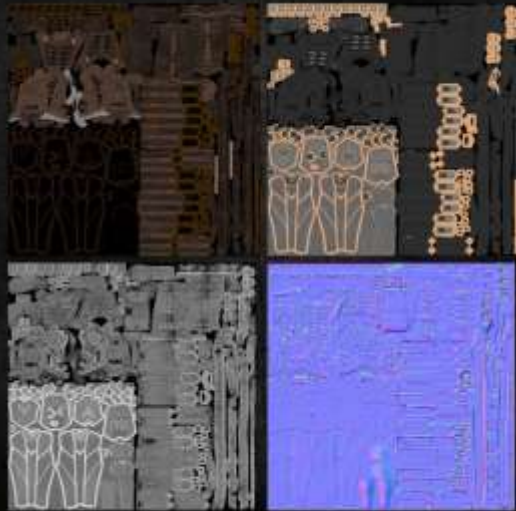
CRYTEK

the drawback was that we had to UV map the asset twice, both low and high.

PBR is very important right now – it is just a new technique used for shading and rendering characters that we will discuss in lots of detail in a future class. All you need to know now is that it helps force consistency between assets.

Standard Maps

- Diffuse
- Specular
- Glossiness
- Normal



Here is the example of what textures or maps are needed for PBR

Top left – diffuse or albedo

Top right –specular – defines the color of the reflection from the surface – metal objects have a lighter color, non metal has a darker color in this map

Bottom left – glossiness, the defines the roughness of the surface, so for example scratches on the metal surface are detailed her

Bottom right – the normal map – and we had discussed the important of this earlier



Now here is the crazy part – how many textures a single character can have

Marcus's body had 32 maps different maps

And that doesn't include the head, mouth, eyes and hair.

