

# Pipelines

# Pipeline?

- Macro level - The process required to get something from idea to an asset on screen in a game
- Micro level - The process used to perform a specific action or step necessary in creating a game. i.e. add animations to a specific character, sculpt terrain for a map, apply shaders to assets
- Pipelines are made up of pipelines
- Designing a successful pipeline requires iteration and pre production

Industry example

# Pipeline exercise

# Tools

- Tools are segments of a pipeline or a pipeline themselves
- Tools decrease the number of steps in an existing pipeline
- Tools automate and/or simplify segments of a pipeline
- Tools decrease time required to create something – transverse a pipeline
- Decreasing time required to create something increases amount of content that can be created
- This is essential in games right now

# Goals

- Improve Efficiency!
  - Assist in a complicated workflow
  - Automate a repetitive task
  - Manage Metadata
  - Incorporate external plugins seamlessly

# What Do Artists Want From Tools?

They want to spend their time being creative, and not...

- Debugging problems
- Learning new complicated processes
- Performing repetitive tasks
- Waiting to see how their art looks in game

# Tool Design Pillars

- Iteration
- Flexibility
- Automation
- Future-proof

# Something Artists Want to Use

- Their involvement in development
- How it communicates through the user interface
- Doesn't disrupt their existing workflow

Involving your customers in  
development

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

# Early Development

maya

Fold\_Card 0.00 [Slider] [Random]

Bend\_End\_Left\_Right 0.00 [Slider] [Random]

Bend\_End\_Up\_Down 0.00 [Slider] [Random]

Bend\_Base\_Up\_Down 0.00 [Slider] [Random]

Bend\_Base\_Left\_Right 0.00 [Slider] [Random]

Twist 0.00 [Slider] [Random]

Twist\_Base 0.00 [Slider] [Random]

Twist\_End 0.00 [Slider] [Random]

Offset\_X 0.00 [Slider] [Random]

Offset\_Y 0.00 [Slider] [Random]

Offset\_Z 0.00 [Slider] [Random]

Rotate\_Left\_Right 0.00 [Slider] [Random]

Rotate\_Up\_Down 0.00 [Slider] [Random]

Width 0.00 [Slider] [Random]

Length 0.00 [Slider] [Random]

Random\_Strength 0.00 [Slider] [Random]  Positive  Negative

Hair Salon

List Selected Focus Attributes Show Help

All  ShaveNodes  HairCards  HeadGeo  HairScalps PolyCount

Options Finalize  Facial Hair  Eyebrows

2115

SquareHairline

V	C	I	X
V	C	I	X
V	C	I	X
V	C	I	X

left\_part\_hair

V	C	I	X
---	---	---	---

back\_hair\_hair

V	C	I	X
---	---	---	---

right\_part\_hair

V	C	I	X
---	---	---	---

Create Hair Surfaces Create Hair Layer

Scalps in Scene:

SquareHairline

Name your hair Layer : newHairLayer

Create New

Curve Styling Tools:

Display Curve Preview Display Hair 100 [Slider]

Brush Cut Mirror Selection Recomb Use Curve Undo

Select Hairstyle based on card type:

hover over a hair style to view the card distribution  Force Single Display

variedHairStyle	quickCoverage	mediumHairStyle
-----------------	---------------	-----------------

left_part	V	C	I	X
back_hair	V	C	I	X
right_part	V	C	I	X

Build Rebuild

Card Editing Tools

Start Update End Update Replace Card UVs Reset Attrs Select All

====Click to Close Attributes Editing Window====

Previous Tab

# Work With An Artist!

- Early Feedback
- Learn from how they work
- Find bugs
- Artists will feel involved in development
- Build a relationship

# Communication!!

- Close proximity
- Desk-side support
- Flexibility
- Observation and assistance



### Hair Salon

**PolyCount**  
 Update  
 V1Social: 1671  
 V1Cinematic: 3957  
 V2Cinematic: 3957

**Isolate** V1SS Dense V1Cn Sparse V2Cn  
**Apply Shader** UV Wavy Straight Set UV  
**Options** Save Finalize Close  
 Facial Hair  
 Eyebrows

**All Objects**  
 All  ShaveNodes  HairCards  
 HeadGeo  HairScalps

SquareHairline	V	C	I	X
human_female_hot	V	C	I	X
toleft_hair	V	C	I	X
topback_hair	V	C	I	X
bottomleft_hair	V	C	I	X
topright_hair	V	C	I	X
bottomback_hair	V	C	I	X
bottomback_cards	V	C	I	X
toleft_cards	V	C	I	X
bottomleft_cards	V	C	I	X
topback_cards	V	C	I	X

Create Hair Surfaces Create Hair Layer

**Scalps in Scene:**  
 SquareHairline

Name your hair Layer: newHairLayer  
 Create New

**Curve Styling Tools:**  
 Display Curve Preview Display Hair 100  
 Brush Cut Recomb Undo  
 Selection Comb To Curve Mirror

**Select Hair Type**  
 Build Replace

**Card Editing Tools**  
 Divisions 6  
 Revolve -18  
 Twist End 0  
 Taper 4  
 Width 10  
 Bulge Amount 13 Position 5  
 Fold Selected  
 CV Edit Mode  
 Update To User Curves  
 Live Mode Update To Shave Curves Stop Live Mode  
 Previous Tab

**Full Hair Layers**  
 Force Single Display

toleft	V	C	I	X	V1SS
topback	V	C	I	X	V1SS
bottomleft	V	C	I	X	V1SS
topright	V	C	I	X	V1SS
bottomback	V	C	I	X	V1SS
toleft_overlayer	V	C	I	X	V1Cn
topback_overlayer	V	C	I	X	V1Cn
bottomleft_overlayer	V	C	I	X	V1Cn
topright_overlayer	V	C	I	X	V1Cn
bottomback_overlayer	V	C	I	X	V1Cn

Create Over Layer  
 count Create V2Cn Flyaways



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**Options** Save Finalize Close  
Facial Hair  
Eyebrows

Create Hair Surfaces Create Hair Layer

**Scalps in Scene:**  
SquareHairline  
Name your hair Layer: newHairLayer  
Create New

**Curve Styling Tools:**  
Display Curve Preview Display Hair 100  
Brush Cut Recomb Undo  
Selection Comb To Curve Mirror

**Select Hair Type**  
Build Replace

**Card Editing Tools**  
Divisions 8  
Revolve 13  
Twist End 0  
Taper 4  
Width 10  
Bulge  
Amount 13  
Position 5  
Fold Selected  
CV Edit Mode  
Update To User Curves  
Live Mode Update To Shave Curves Stop Live Mode

**All Objects**  
All ShaveNodes HairCards  
HeadGeo HairScalps  
SquareHairline V C I X  
human\_female\_hot V C I X  
topleft\_hair V C I X  
topback\_hair V C I X  
bottomleft\_hair V C I X  
topright\_hair V C I X  
bottomback\_hair V C I X  
bottomback\_cards V C I X  
topleft\_cards V C I X  
bottomleft\_cards V C I X

**Full Hair Layers**  
Force Single Display  
topleft V C I X  
topback V C I X  
bottomleft V C I X  
topright V C I X  
bottomback V C I X  
topleft\_overlayer V C I X  
topback\_overlayer V C I X  
topright\_overlayer V C I X  
bottomleft\_overlayer V C I X  
bottomback\_overlayer V C I X  
Create Over Layer  
count Create V2Cin Flyaways

# BUNGIE'S HAIR SALON



### Hair Salon

**PolyCount**  
Update  
V1Social: 1671  
V1Cinematic: 3957  
V2Cinematic: 3957

**Isolate** V1SS Dense V1Cin V2Cin  
**Apply Shader** UV Wavy UV Straight Set UV  
**Options** Save Finalize Close  
 Facial Hair  
 Eyebrows

Create Hair Surfaces Create Hair Layer

**Scalps in Scene:**  
SquareHairline  
Name your hair Layer: newHairLayer  
Create New

**Curve Styling Tools:**  
 Display Curve Preview Display Hair 100  
Brush Cut Recomb Undo  
Selection Comb To Curve Mirror

**Select Hair Type**  
Build Replace

**Card Editing Tools**  
Divisions 8  
Revolve 13  
Twist End 0  
Taper 4  
Width 10  
Buldge  
Amount 13  
Position 5  
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Update To User Curves  
Update To Shave Curves Stop Live Mode  
 Live Mode

**All Objects**  
 All  ShaveNodes  HairCards  
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bottomleft_hair	V	C	I	X
topright_hair	V	C	I	X
bottomback_hair	V	C	I	X
bottomback_cards	V	C	I	X
toleft_cards	V	C	I	X
bottomleft_cards	V	C	I	X

**Full Hair Layers**  
 Force Single Display

toleft	V	C	I	X
topback	V	C	I	X
bottomleft	V	C	I	X
topright	V	C	I	X
bottomback	V	C	I	X
toleft_overlay	V	C	I	X
topback_overlay	V	C	I	X
topright_overlay	V	C	I	X
bottomleft_overlay	V	C	I	X
bottomback_overlay	V	C	I	X

Create Over Layer  
count Create V2Cin Flyaways

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Name your hair Layer : newHairLayer  
Create New

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Display Curve Preview Display Hair 100  
Brush Cut Recomb Undo  
Selection Comb To Curve Mirror

**Select Hair Type**  
Build Replace

**Card Editing Tools**  
Divisions 8 Revolve 13 Twist End 0 Taper 4 Width 10 Buldge Amount 13 Position 5  
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bottomleft_hair	V	C	I	X
topright_hair	V	C	I	X
bottomback_hair	V	C	I	X
bottomback_cards	V	C	I	X
toleft_cards	V	C	I	X
bottomleft_cards	V	C	I	X

**Full Hair Layers**  
Force Single Display

toleft	V	C	I	X
topback	V	C	I	X
bottomleft	V	C	I	X
topright	V	C	I	X
bottomback	V	C	I	X
toleft_overlay	V	C	I	X
topback_overlay	V	C	I	X
topright_overlay	V	C	I	X
bottomleft_overlay	V	C	I	X
bottomback_overlay	V	C	I	X

Create Over Layer  
Create V2Cin Flyways

# BUNGIE'S HAIR SALON



### Hair Salon

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Name your hair Layer: newHairLayer  
Create New

**Curve Styling Tools:**  
 Display Curve Preview Display Hair 100  
Brush Cut Recomb Undo  
Selection Comb To Curve Mirror

**Select Hair Type**  
Build Replace

**Card Editing Tools**  
Divisions 8 Revolve 13 Twist End 0 Taper 4 Width 10 Buldge Amount 13 Position 5  
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human_female_hot	V	C	I	X
opleft_hair	V	C	I	X
topback_hair	V	C	I	X
bottomleft_hair	V	C	I	X
topright_hair	V	C	I	X
bottomback_hair	V	C	I	X
bottomback_cards	V	C	I	X
opleft_cards	V	C	I	X
bottomleft_cards	V	C	I	X

**Full Hair Layers**  
 Force Single Display

opleft	V	C	I	X
topback	V	C	I	X
bottomleft	V	C	I	X
topright	V	C	I	X
bottomback	V	C	I	X
opleft_overlay	V	C	I	X
topback_overlay	V	C	I	X
topright_overlay	V	C	I	X
bottomleft_overlay	V	C	I	X
bottomback_overlay	V	C	I	X

count Create V2Cin Flyaways

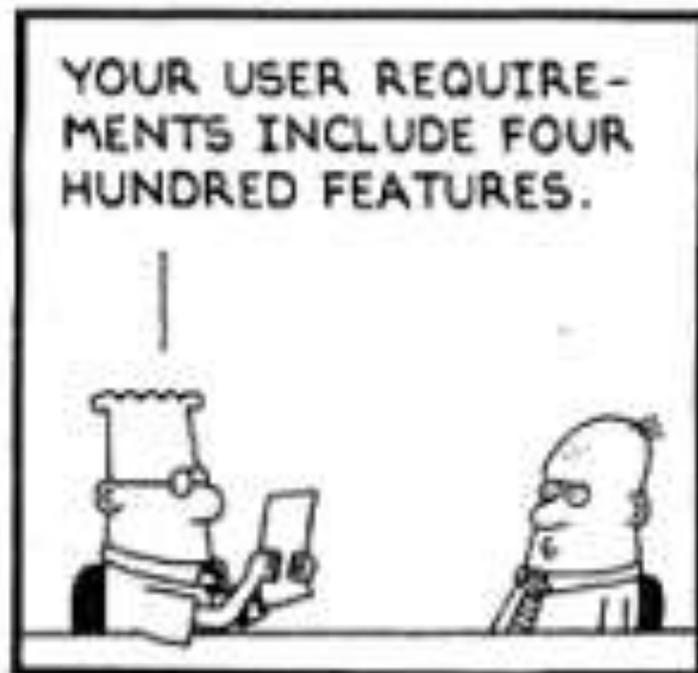
# BUNGIE'S HAIR SALON

# UX Design

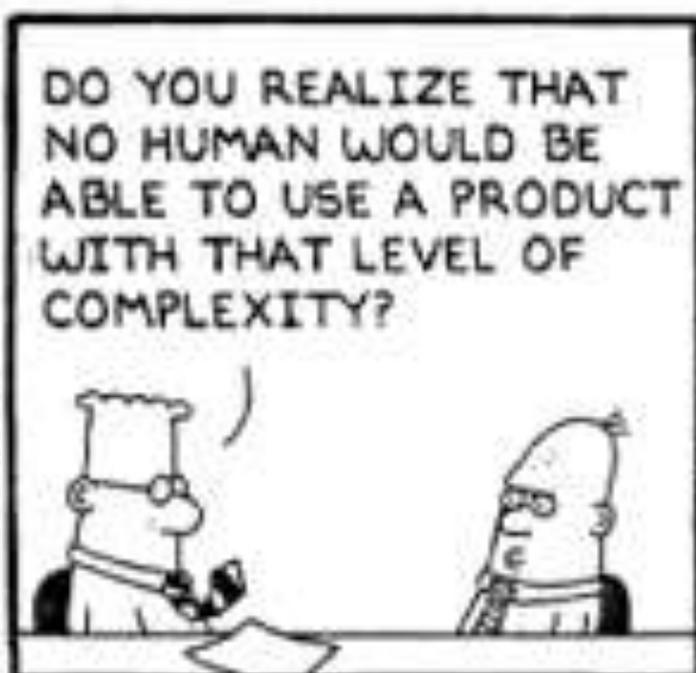
The process of enhancing user satisfaction by improving the usability, accessibility, and pleasure provided in the interaction between the user and the product

# Examples of Bad User Experiences

**DILBERT** by Scott Adams



www.dilbert.com  
scottadams@aol.com



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Bulk Rename Utility

File Actions Options Help

Computer

- Local Disk (C:)
- DVD Drive (E:)
- BD-ROM Drive (F:)

Name	New Name	Sub...	Type	Size	Created	Modifi...	Acce...

**RegEx (✓ R)**

Match   
 Replace   
 Include Ext.

**Repl. (✓ R)**

Replace   
 With   
 Match Case

**Remove (5) (✓ R)**

First n  Last n   
 From  to   
 Chars  Words

Crop  Before   
 Digits  High  Trim  
 D/S  Accents  Chars  
 Sym. Lead Dots  Non

**Add (7) (✓ R)**

Prefix   
 Insert   
 at pos.

Suffix   
 Word Space

**Auto Date (✓ R)**

Mode  None   
 Type  Creation (Cur   
 Fmt  DMY

Sep.  Seg.   
 Custom   
 Cent. Off.  0

**Numbering (10) (✓ R)**

Mode  None  at  0   
 Start  1  Incr.  1   
 Pad  0  Sep.

Break  0   Folder  
 Type  Base 10 (Decimal)   
 Roman Numerals  None

**File (2) (✓ R)**

Name  Keep

**Case (4) (✓ R)**

Same   
 Excep.

**Move/Copy (6) (✓ R)**

None  1   None  1  Sep.

**Append Folder Name (9) (✓ R)**

Name  None  Sep.  Levels  1

**Extension (11) (✓ R)**

Same

**Selections (12) (✓ R)**

Filter  \*   Folders  Hidden  Name Len Min  0  Max  0   
 Match Case  Files  Subfolders  Path Len Min  0  Max  0

**New Location (13) (R)**

Path     
 Copy not Move

Reset

Revert

Rename

\*\* Love Bulk Rename Utility? Try ViceVersa PRO, file sync and backup software for Windows. [Click Here To Find Out More ...](#)

0 Objects (0 Selected)

Favourite

## PX4, XP300, XP400, X-Ray Pairing Instructions

1) Power the headset off and disconnect the transmitter from the USB port on the console, then plug the Transmitter back in. The **Power/Pairing LED** on the transmitter should be slowly blinking and the LED on the headset should be off.

2) Press and hold the **PAIR Button** on the transmitter for about 5 seconds until the **Power/Pairing LED** begins to flash rapidly (twice per second), then release the button.

*Note: If it is blinking much more than 2 times per second, the button was held for much too long (15+ seconds), and you must start over from Step 1.*

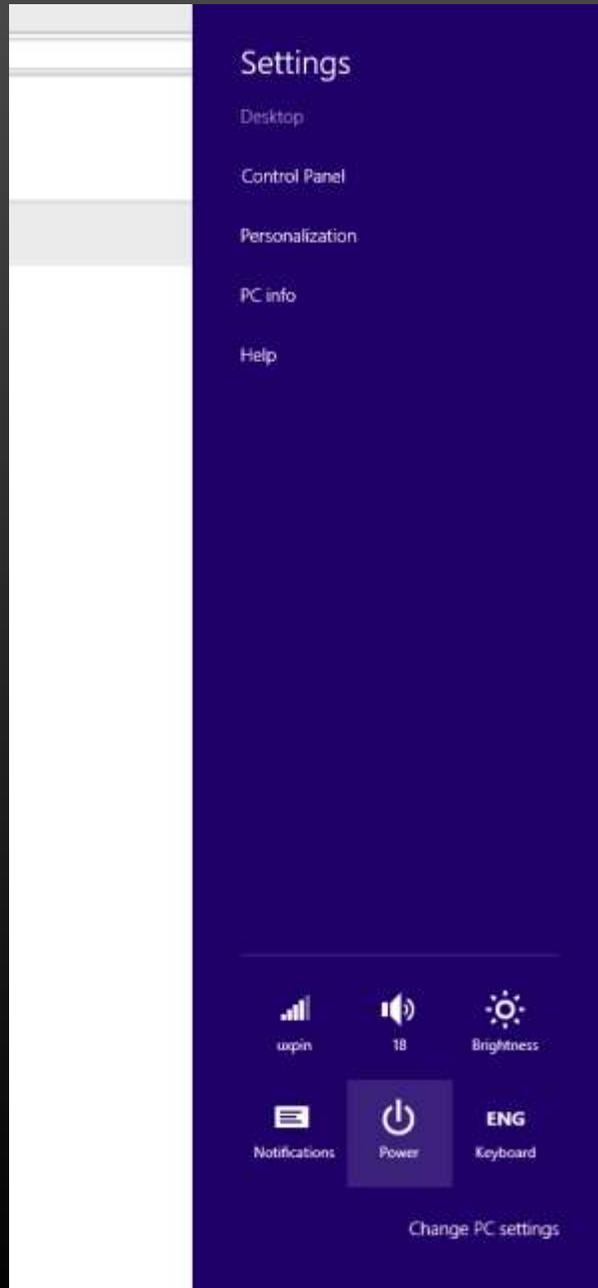
3) Press and hold the **Power Button** on the headset for **6-8 seconds** until you hear a **second set of two beeps**. You will hear two beeps (headset on), followed by three ascending beeps (Bluetooth on), then the second set of two beeps (pairing headset). The Power LED on the Headset should now be blinking rapidly like the transmitter (twice per second).

*Note: If it is double blinking (two quick blinks followed by a pause), then the button was not held long enough, and you must start over from Step 1.*

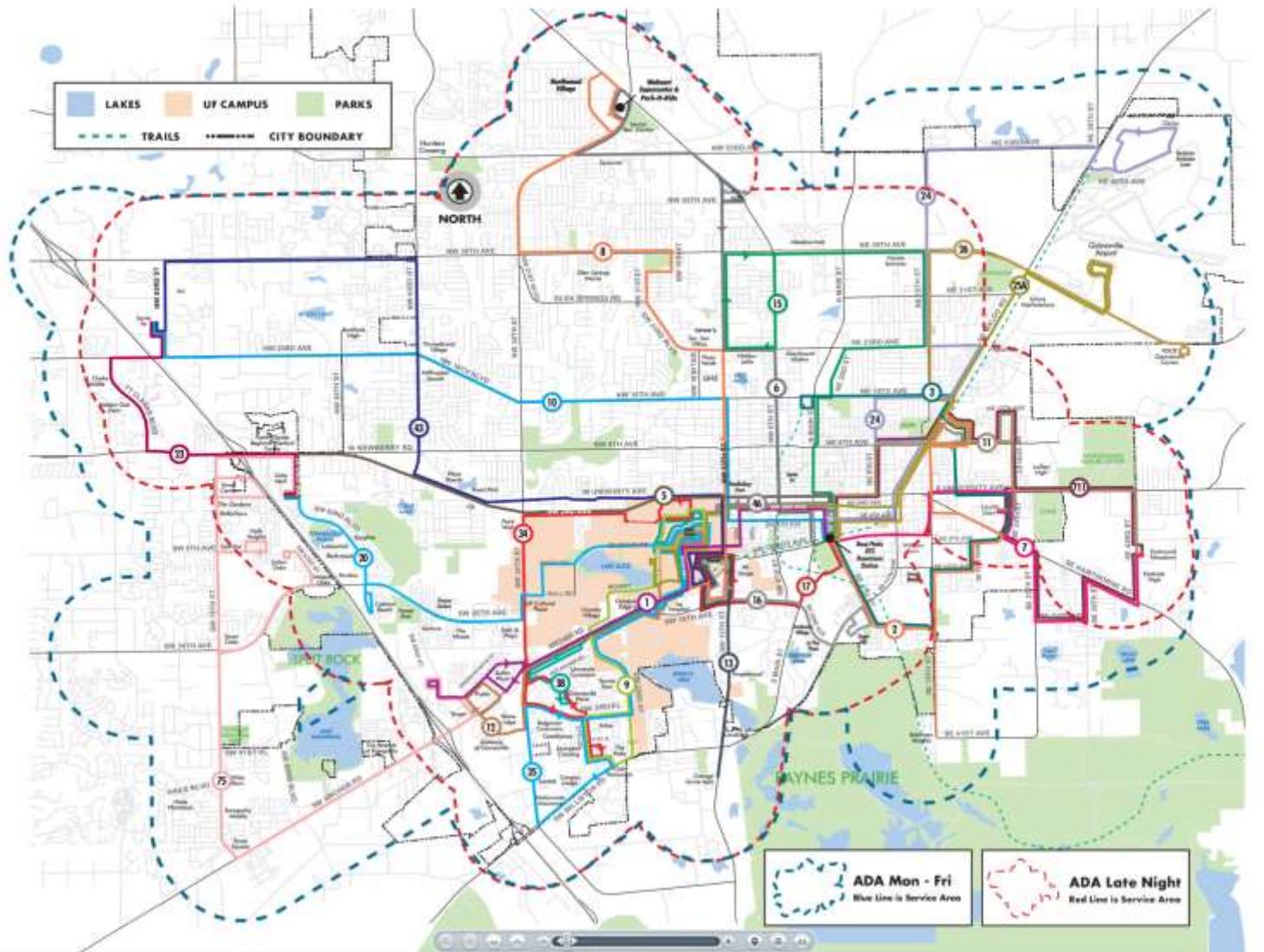
4) Wait about 10 to 15 seconds. **The Power/Pairing LED** on the transmitter should be **solid**, and the Power LED on the headset will be blinking once per second.

The headset is now paired to the transmitter and is ready to play game audio.

In Windows 8, it requires four actions to shut down your PC



# Examples of Good User Experience



SUMMER 2016

- CITY ROUTES
- CAMPUS ROUTES
- HOLIDAY/REDUCED
- A.A.A.
- TUTORIAL
- LATER GATOR
- GATOR LOCATOR

CHOOSE ROUTE MAPS & SCHEDULES

Rosa Parks RTA Downtown Station To North Main Post Office

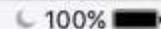


Monday to Friday Every 40 min.  
 Saturday/Sunday No Service

	A	B	C	C	B	A		
	ROSA PARKS RTA DOWNTOWN STATION	NE WALMART SUPERCENTER	N MAIN POST OFFICE	N MAIN POST OFFICE	NE WALMART SUPERCENTER	ROSA PARKS RTA DOWNTOWN STATION		
	1,2,3,6,7,10,11,15, 17,24,25,26,27,46	2,11,26	15	15	2,11,26	1,2,3,6,7,10,11,15, 17,24,25,26,27,46		
	To N Main Post Office			To Downtown		R-RUNS ON REDUCED SERVICE DAYS		
<b>MONDAY TO FRIDAY</b>	9:30am	9:47	9:55	R	9:59am	10:05	10:22	R
	10:30	10:47	10:55	R	10:59	11:05	11:22	R
	11:30	11:47	11:55	R	11:59	12:05pm	12:22	R
	12:30pm	12:47	12:55	R	12:59	1:05	1:22	R
	1:30	1:47	1:55	R	1:59	2:05	2:22	R
	2:30	2:47	2:55	R	2:59	3:05	3:22	R
	3:30	3:47	3:55	R	3:59	4:05	4:22	R
	4:30	4:47	4:55	R	4:59	5:05	5:22	R



9:41 AM



[Settings](#)

## Do Not Disturb

Manual



When Do Not Disturb is enabled calls and alerts that arrive while locked will be silenced, and a moon icon will appear in the status bar.

Scheduled



Allow Calls From

Favorites >

Incoming calls from your favorites will not be silenced.

Repeated Calls



When enabled, a second call from the same person within three minutes will not be silenced.

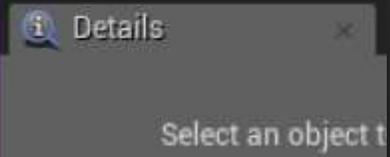
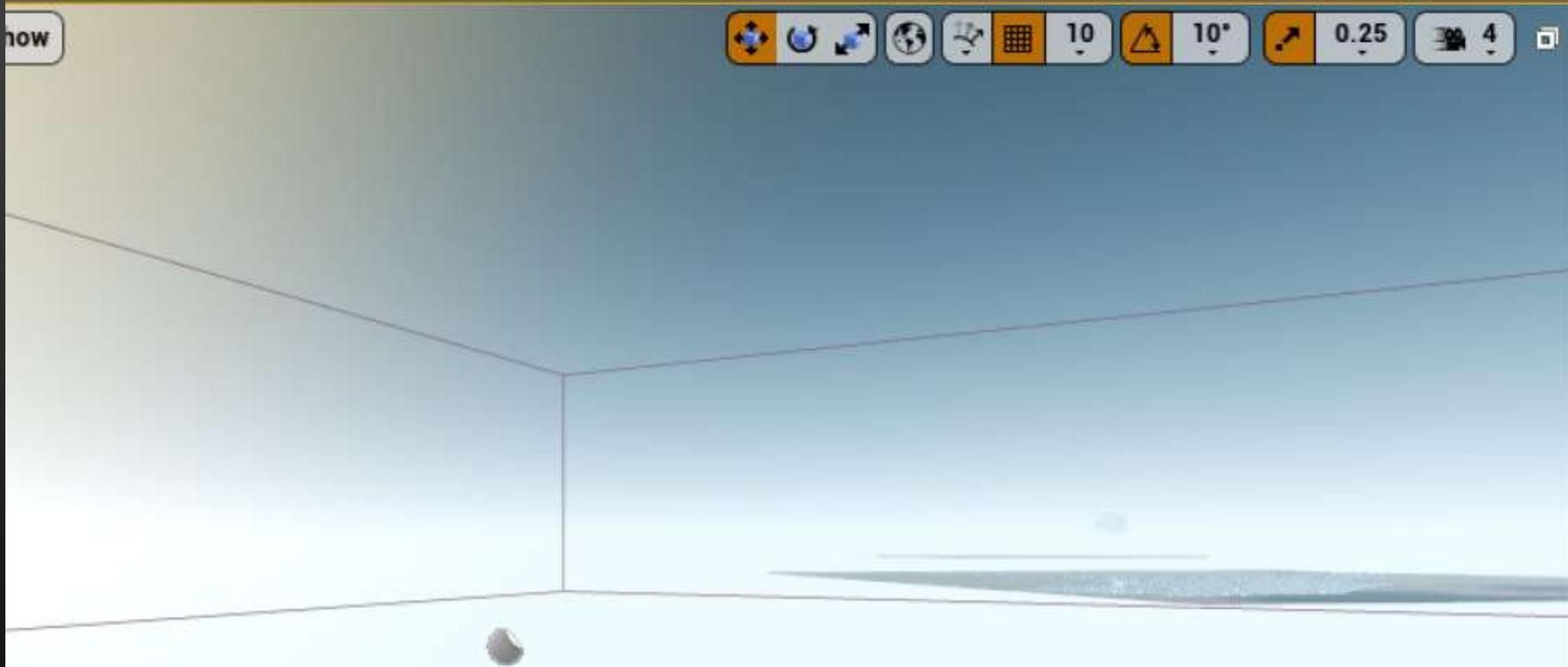
SILENCE:

Always

Only while iPhone is locked



Incoming calls and notifications will be silenced while iPhone is locked.



This tutorial points out each of the key interface elements for the Unreal Editor.

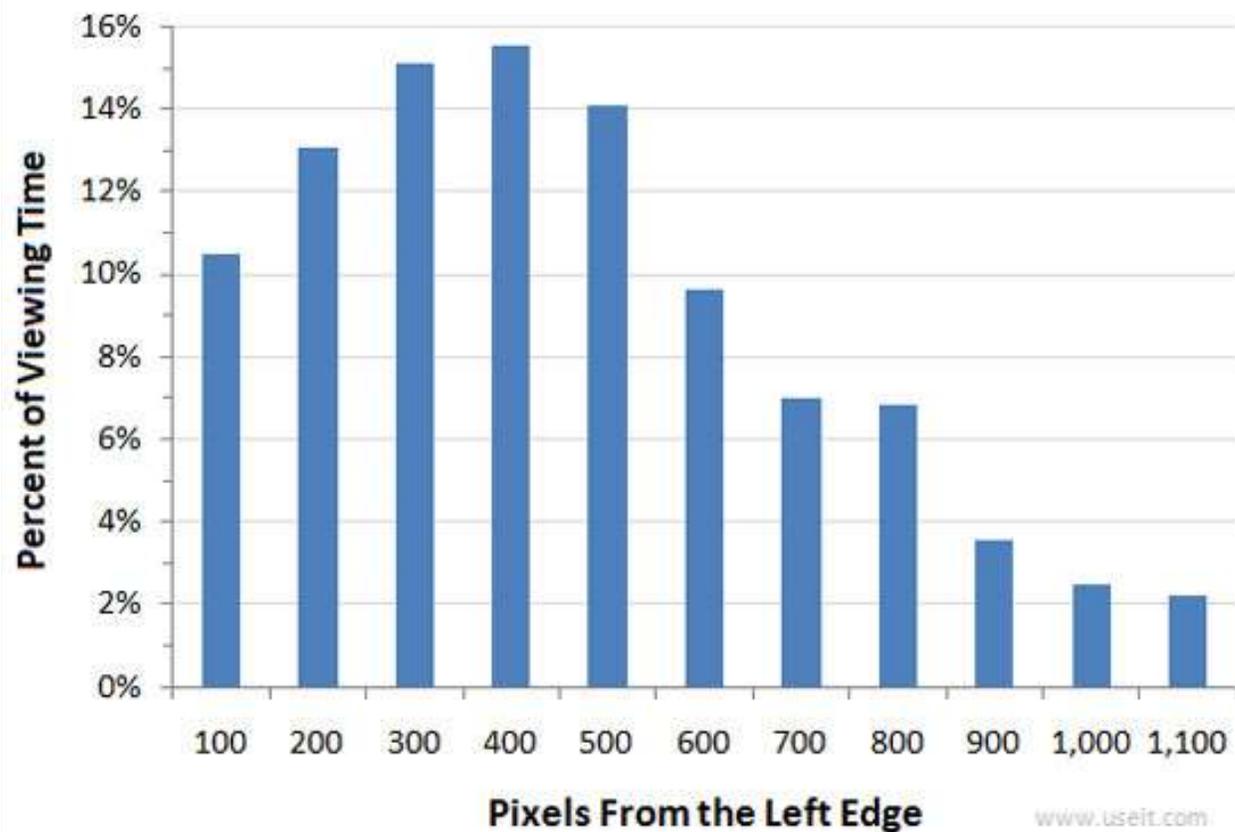


# Design Principles

# Formatting

- Read from left to right
- Read from top to bottom
- The golden ratio is real!





www.useit.com

The screenshot shows the AdAge.com website with a heatmap overlay. The heatmap indicates that users spend the most time in the top-left quadrant, specifically on the main news articles. The right sidebar and bottom navigation area show significantly lower engagement, indicated by blue colors.

**THE WEBBY AWARDS**  
 NOMINATING THE WORLD'S BEST WEBSITES AND THE PEOPLE BEHIND THEM.

**AdAge.com DAILY NEWS**

**Free Inner Advertising Agent Modestville**

**LAURENCE BOSCHETTO NAMED DRAFT HEIR**

**CURTIS: 40TH BIRTHDAY WIFE YERGEN'S MARRIAGE PROSPECTS ASSESSED**

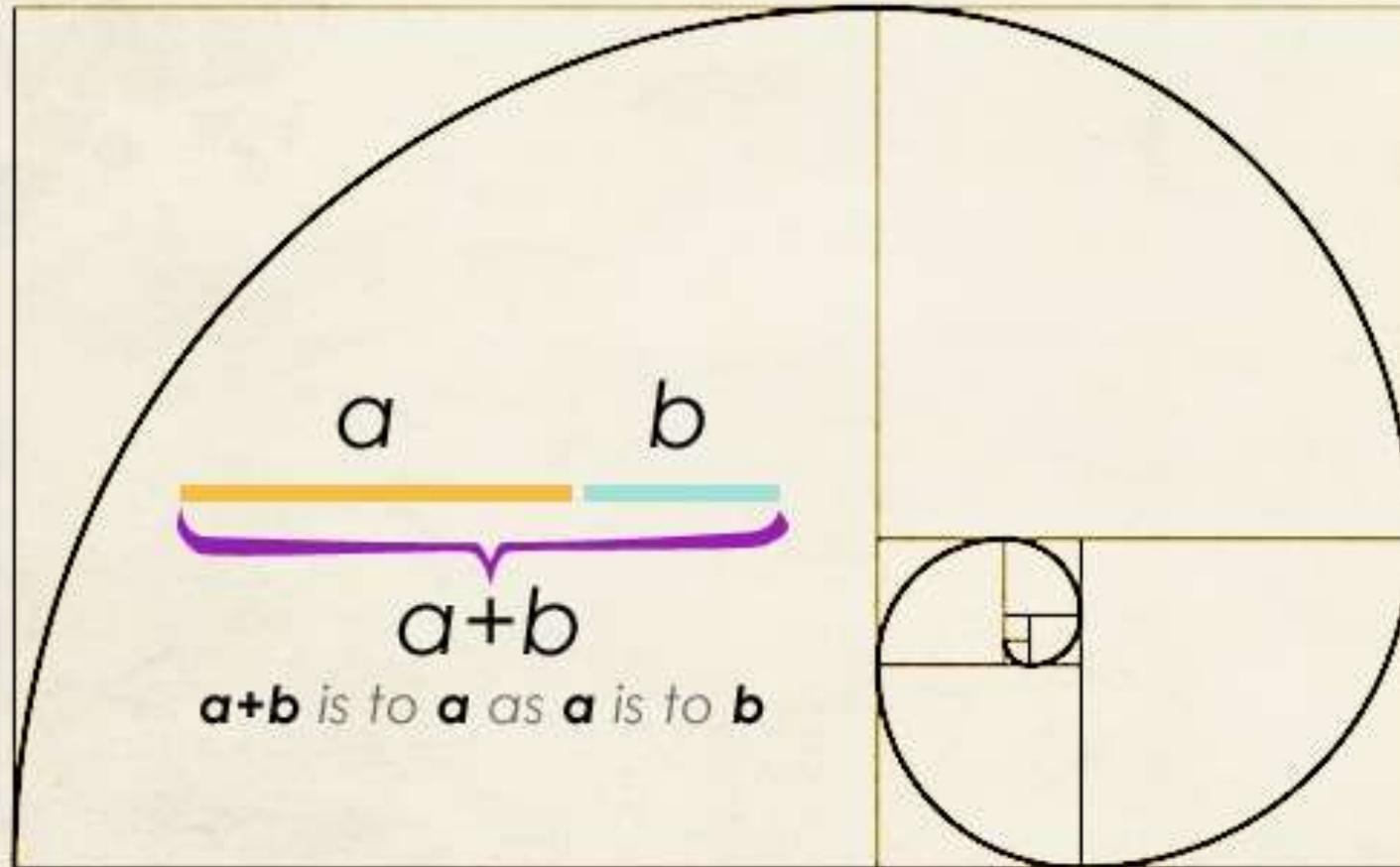
**IBEX'S BULLISH AD PACE TALKS BARELY MOVE THE NEEDLE**

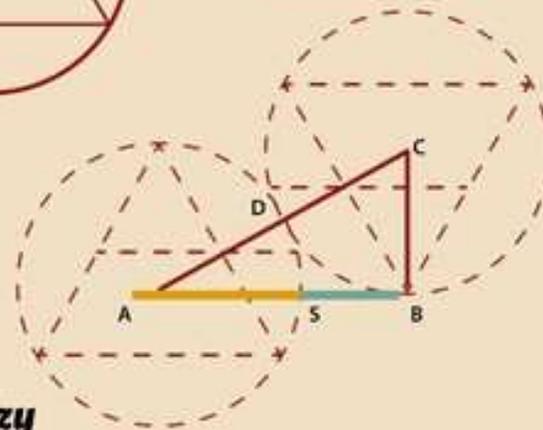
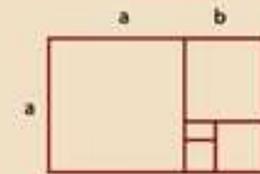
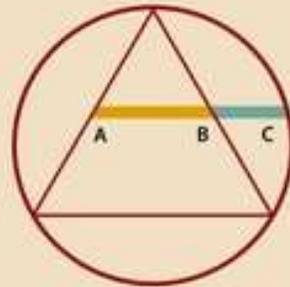
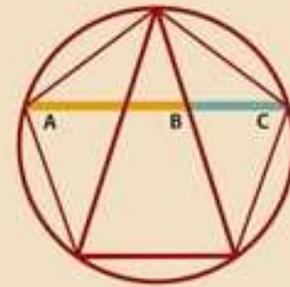
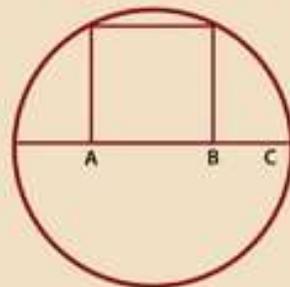
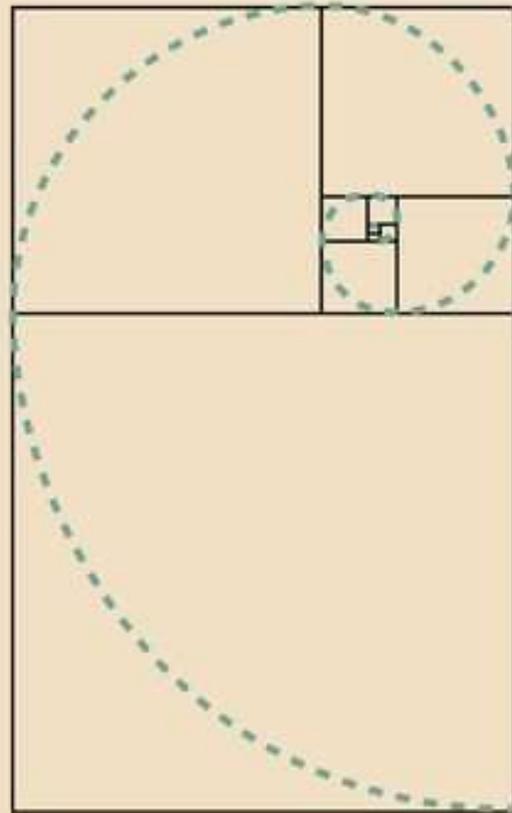
**HILTON ROLLS OUT FIRST TV AD CAMPAIGN IN 10 YEARS**

**SIX FLAGS RESTRUCTURES MARKETING EXECUTIVE SUITE AND STRATEGIES**

**FOR AN INNOVATIVE NEW**

# -The Golden Ratio-





Designed by **Vecteezy**

# Emphasize

- Use color to draw attention
- Use Images to draw attention
- Use scale changes to draw attention
- Don't clutter

# Communicate

- Show meaning through color usage
- Embed documentation
- Include tooltips
- Carefully consider all wording
- Iterate on terminology

# Cloth Simulation Tools as an Example of Good VS Bad UIs

# Bad UX



# Havok cloth tool

- Create a Mesh
- Set attributes in Maya
- Launch the Havok Plugin Cloth Setup Tool (different for each Maya)
- Set up your cloth
- Export data for game
- Get data to work in the game

An improved version of the  
Havok cloth tool

Add Sim Meshes

Add  
Remove  
Select

Look for Problems

What Kind of Garment?

-  Player Badge
-  Player Cape
-  Player Cape (Long)
-  Player Cape (Short) (One Shoulder)
-  Player Robe
-  Fallen Cape
-  Hive Shroud

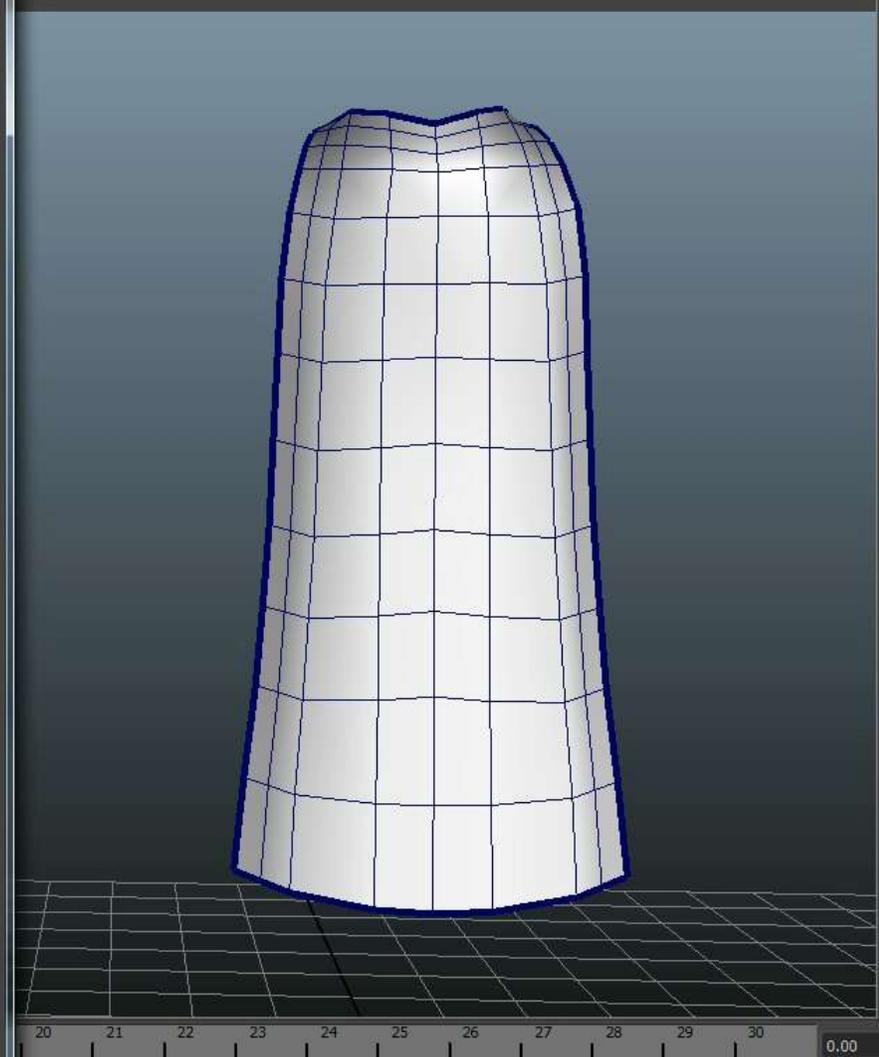
What Type of Fabric?

-  Cotton
-  Leather
-  Silk
-  <Custom>

Setup Steps

- Setup Regions
- Choose Skeleton
- Choose Colliders
- Setup LOD
- Triangulate
- Setup Skinning

Preview Cloth Done



# Creating a Positive User Experience

- Communicates with the user
- Influences the user's progress
- Provides feedback
- A simple and clean User Interface

# Cloth Tool Specifics

- Translates Havok data terminology to familiar terms
- Automates as much as possible
- Incorporates documentation into the tool
- Checks for problems throughout setup

Add Sim Meshes

Look for Problems

What Kind of Garment?

- Player Badge
- Player Cape
- Player Cape (Long)
- Player Cape (Short (One Shoulder))
- Player Robe
- Fallen Cape
- Hive Shroud

What Type of Fabric?

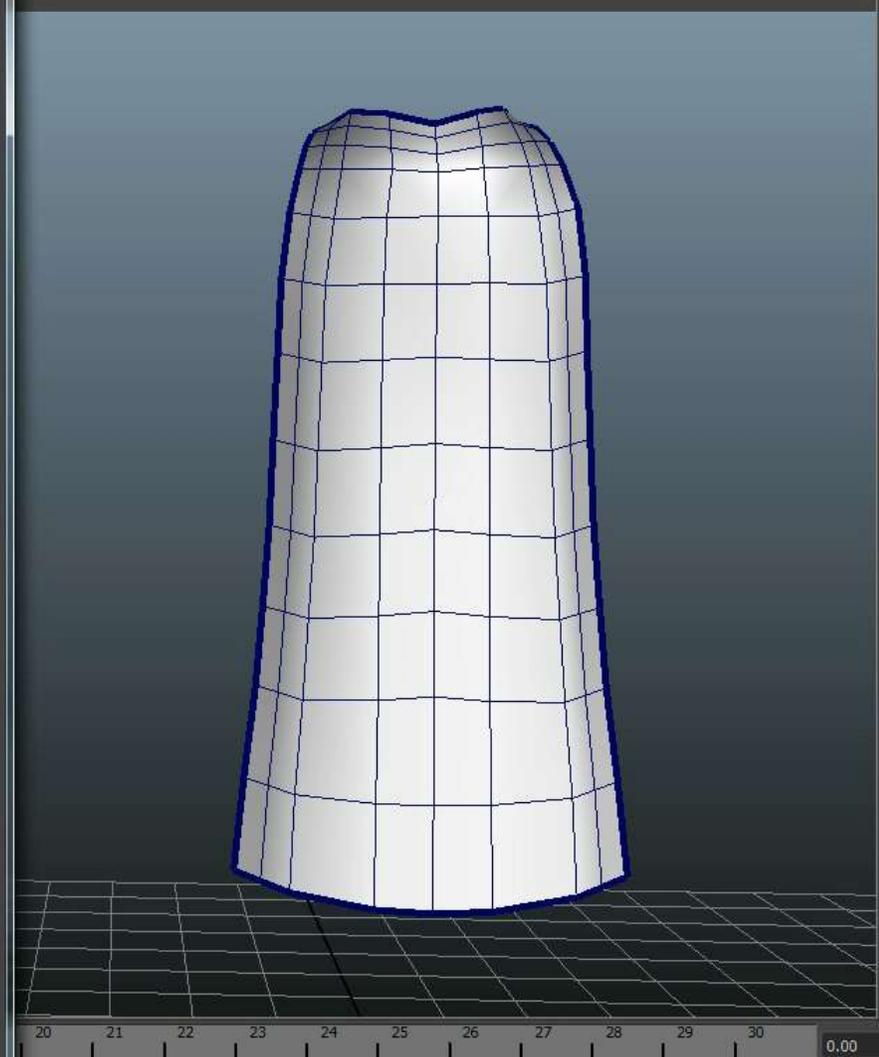
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- Silk
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Setup Steps

- Setup Regions
- Choose Skeleton
- Choose Colliders
- Setup LOD
- Triangulate
- Setup Skinning

Advanced

Preview Cloth Done



# Real World Terms

Parameters abstracted to familiar terms

What Kind of Garment?

- Player Badge
- Player Cape**
- Player Cape (Long)
- Player Cape (One Shoulder)
- Player Robe
- Fallen Cape
- Hive Shroud

What Type of Fabric?

- Cotton**
- Leather
- Silk
- <Custom>

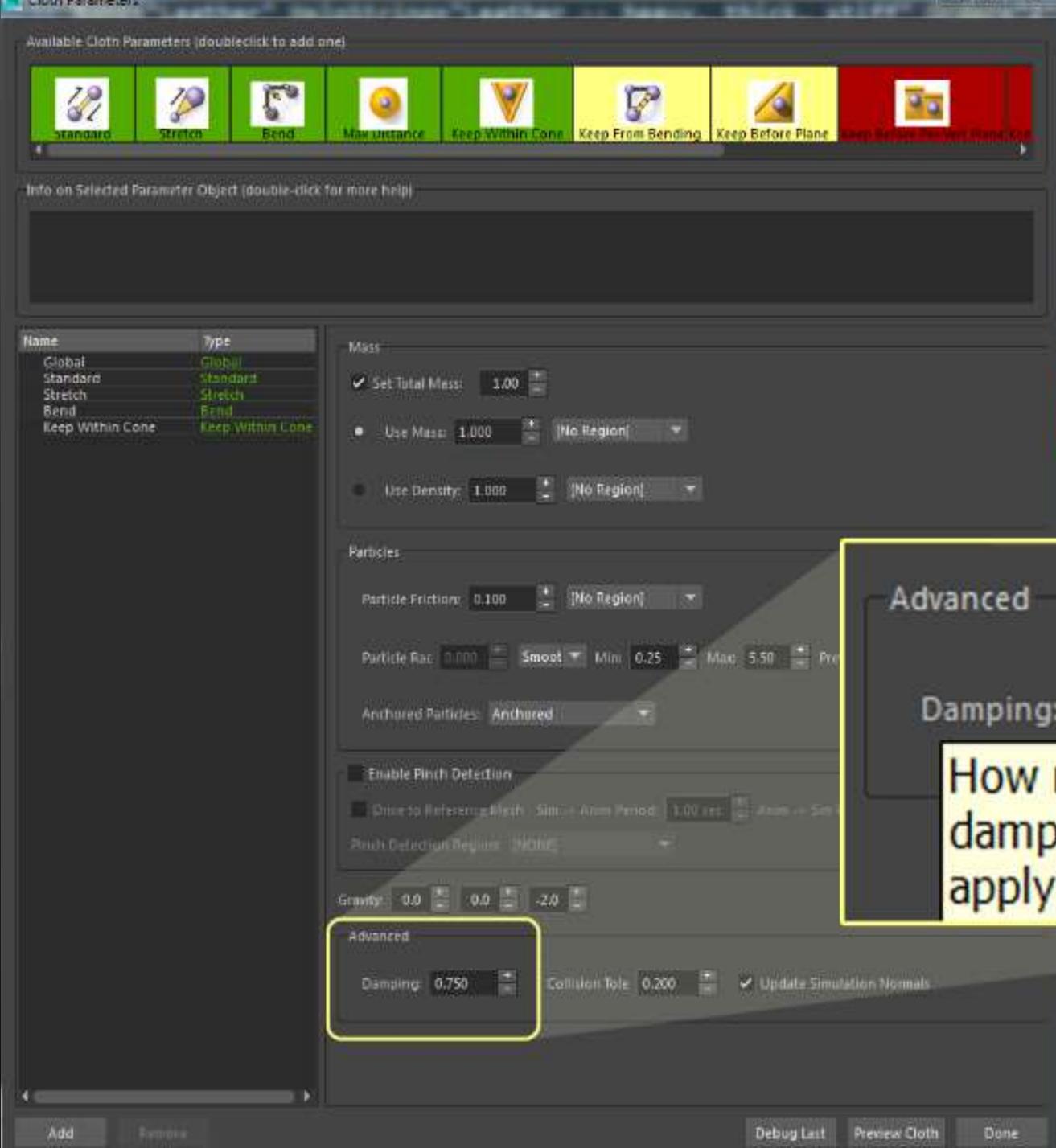
Setup Steps

- Setup Regions
- Choose Skeleton (DONE)**
- Choose Colliders (DONE)**
- Setup LOD
- Triangulate
- Setup Skinning

FYI: Found colliders named 'Collidable\_b\_pelvis' -- using that as default colliders.  
FYI: This garment is within budget! (81 simulated verts out of 120 available)

# Internal Workings

```
<Fabric Name="Leather" HelpString="Leather -- heavy, thick, stiff" Order="2">  
  <GlobalParameter Name="Global" Type="Global" Gravity="0 0 -3">  
    <Value Name="Particle Friction" Value="0.33">  
    </Value>  
    <Value Name="Damping" Value="0.95">  
    </Value>  
  </GlobalParameter>  
  <Parameter Name="Standard" Type="Standard">  
    <Value Name="Stiffness" Value="1.0">  
    </Value>  
  </Parameter>  
  <Parameter Name="Stretch" Type="Stretch">  
    <Value Name="Rigid Factor" Value="1.0">  
    </Value>  
    <Value Name="Stretch Stiffness" Value="1.0">  
    </Value>  
  </Parameter>
```



The artist still has full control

Advanced

Damping: 0.750

How much particle damping do we apply?

Region Name	Method	Status
Skinned	Selection	DONE! (18 verts)
Anchored	Selection	DONE! (7 verts)
Simulated	AutoWeight	DONE! (36 verts)
Top_Half	Selection	Not Started
Bottom_Edge	Selection	DONE! (7 verts)
Bottom_Corners	Selection	DONE! (2 verts)
Checkerboard	AutoWeight	DONE! (27 verts)
MiddleAndBottom	AutoWeight	DONE! (14 verts)

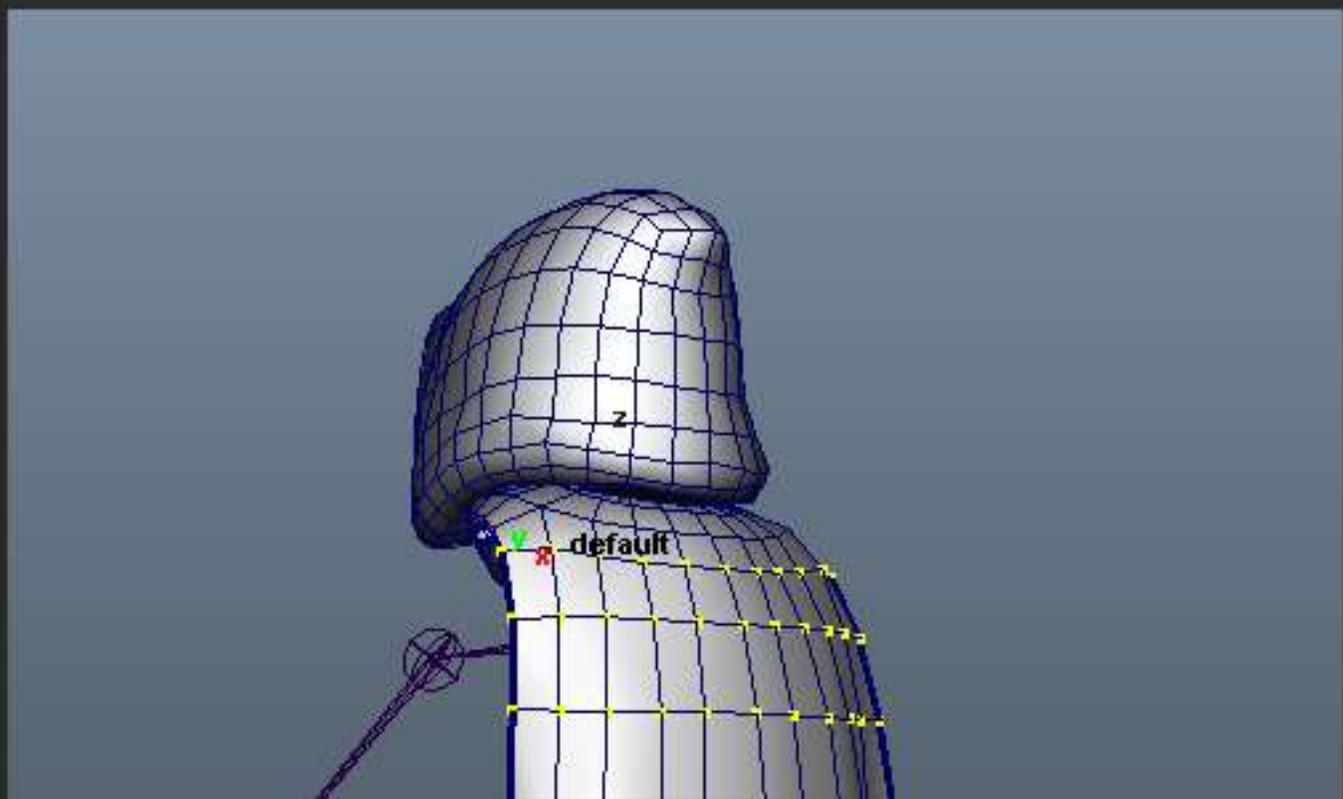
Top\_Half

Selection

Not Started

### Info About Current Region

These are the points of the cape that collide with the **top half** of the player. This is what the *upper arms* and *back* collide against.



```
Region Name="Skinned" HelpString="[b]Skinned[/b] points are where the cape attaches to the character"
</Region>
Region Name="Anchored" HelpString="[b]Anchored[/b] points are the [i]last span[/i] of the skinned region"
</Region>
Region Name="Simulated" HelpString="[b]Simulated[/b] points: these get moved by the cloth simulation"
</Region>
```

```
<Region Name="Top_Half" HelpString="These are the points of the cape that collide with the
[b]top half[/b] of the player. This is what the [i]upper arms[/i] and [i]back[/i] collide against."
HelpImage="CapeLong-TopHalf.png" VertexSelectionOnly="True">
</Region>
```

```
</Region>
```

```
<Collider Name="Collidable_b_spine_3" HelpString="Spine 3 collider"
CollisionRegion="Top_Half">
</Collider>
```

```
<Collider Name="Collidable_b_l_upperarm" HelpString="Left UpperArm collider"
CollisionRegion="Top_Half">
</Collider>
```

```
<Collider Name="Collidable_b_r_upperarm" HelpString="Right UpperArm collider"
CollisionRegion="Top_Half">
</Collider>
```

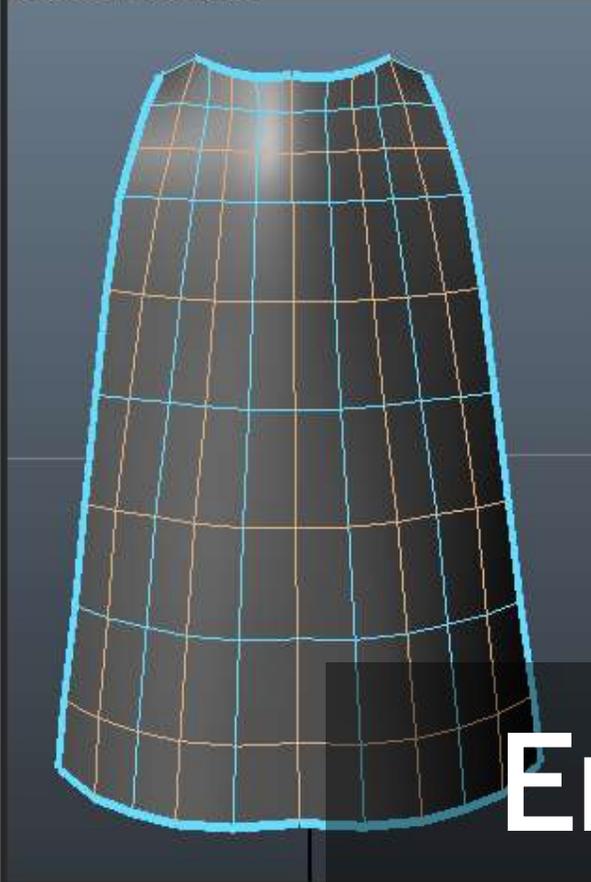
```
<Collider Name="Collidable_b_l_calf" HelpString="Left Calf collider" CollisionRegion="Bottom_Half">
</Collider>
```

The engine will switch to simulate the low-res mesh when the character is far away, or if there are lots of cloth garments close to the camera.

### This is what you do:

- Select spans that should be deleted in the low-res mesh.
- Start by selecting *every other span*.
- Watch the **Current LOD Verts** number to the right.
- Repeat selecting spans until you have the right number of verts for the LOD mesh.

Here's an example:



40

LOD Vert Goal:

40

Over/Under by:

0

Sel Skinned Verts:

21

# Embedded Documentation

Tool communicates with the  
artist throughout setup

We'll automatically build an LOD mesh from this selection later.

- Don't actually delete these spans! We'll do that later (on a copy of the mesh).
- Selecting spans in the skinned section of the cloth is okay, but *doesn't count* for LOD.

# Embedded Documentation

- User feels confident with decisions
- No worries about forgetting steps
- Mistakes are harder to make and less frequent
- Eliminates confusion

Conclusion: Cloth Tool

# Iteration

- Setup is quick
- Setup issues are easy to find
- Clear workflow makes artists able to fix simulation bugs early on
- Simulation parameters are easy to change



# Automation

- Choices such as fabric type immediately set multiple values at once
- ◆ Settings automated based on data from the scene
- New XML files for garments and cloth



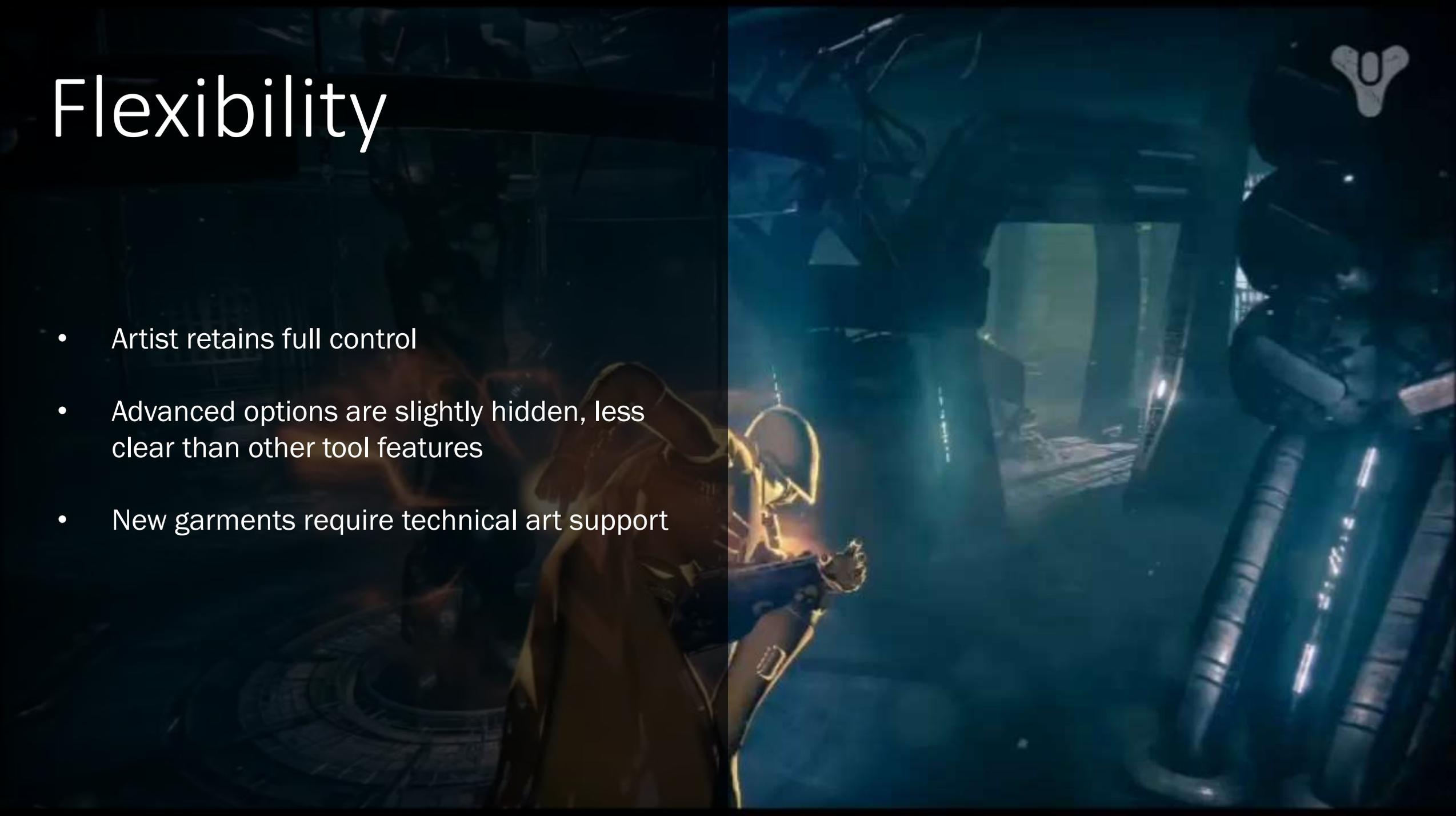
# Future Proof

- Pipeline can easily scale to 400+ garments
- New garments and fabrics are easy to add by a technical artist
- Supports Havok specific components, but fundamentals could still work for all simulation tools



# Flexibility

- Artist retains full control
- Advanced options are slightly hidden, less clear than other tool features
- New garments require technical art support

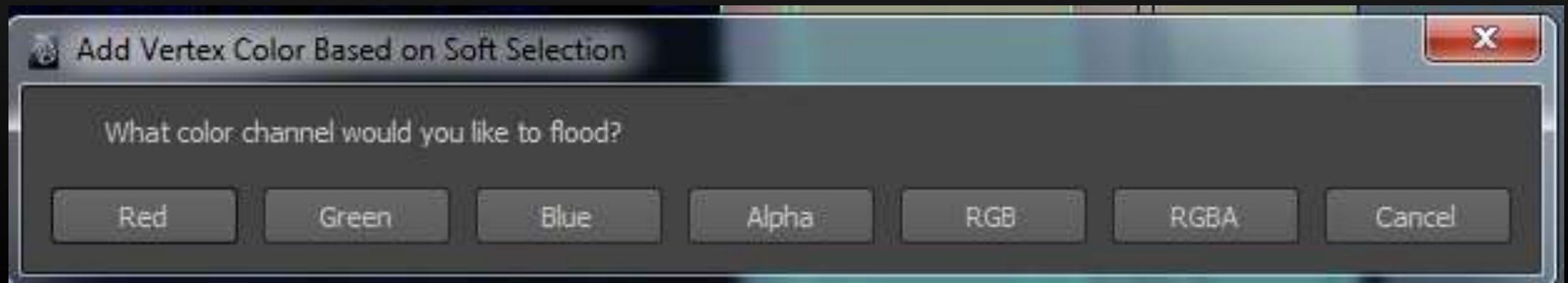
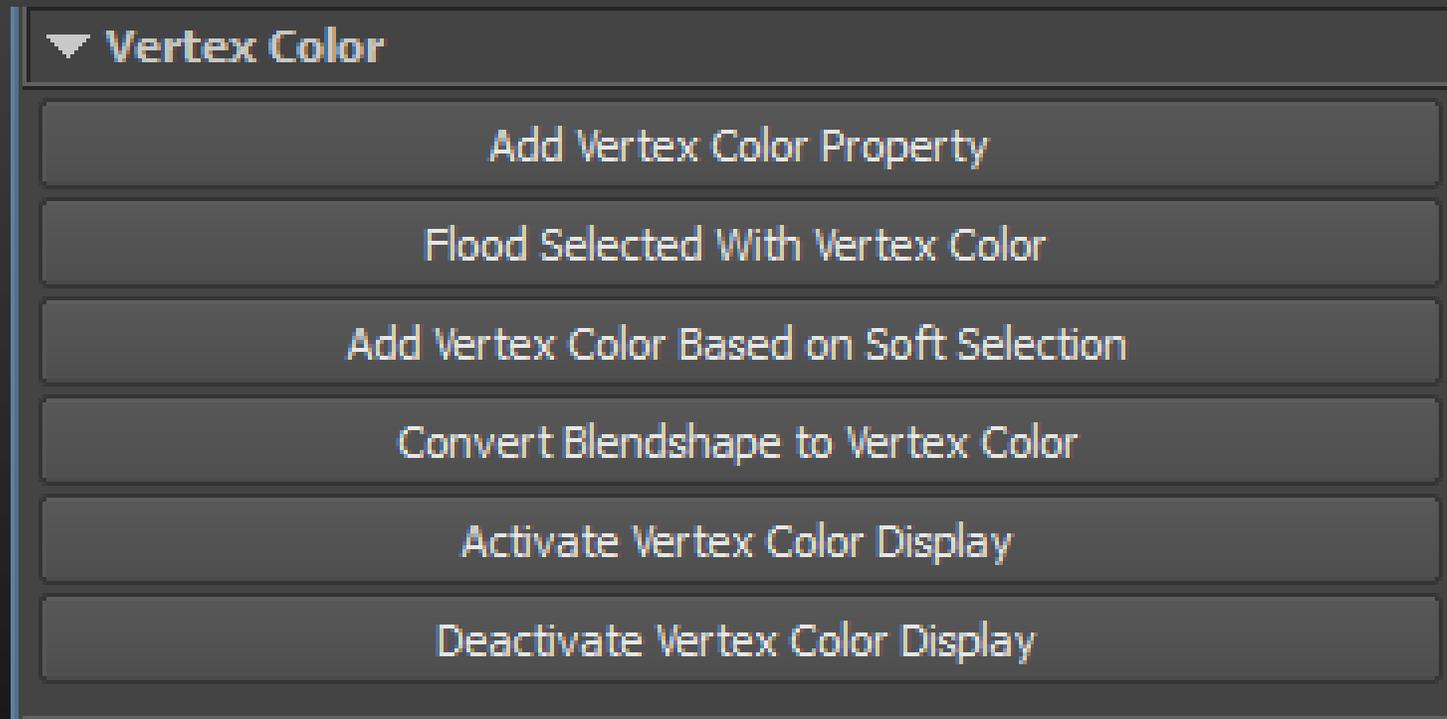


# Overall...

- Very successful at meeting design pillars
- Builds a positive user experience
- Takes a complicated workflow (cloth simulation) and breaks it down into easy to understand steps
- Embedded documentation
- Technical artist can add new features without editing code

Build from existing workflows

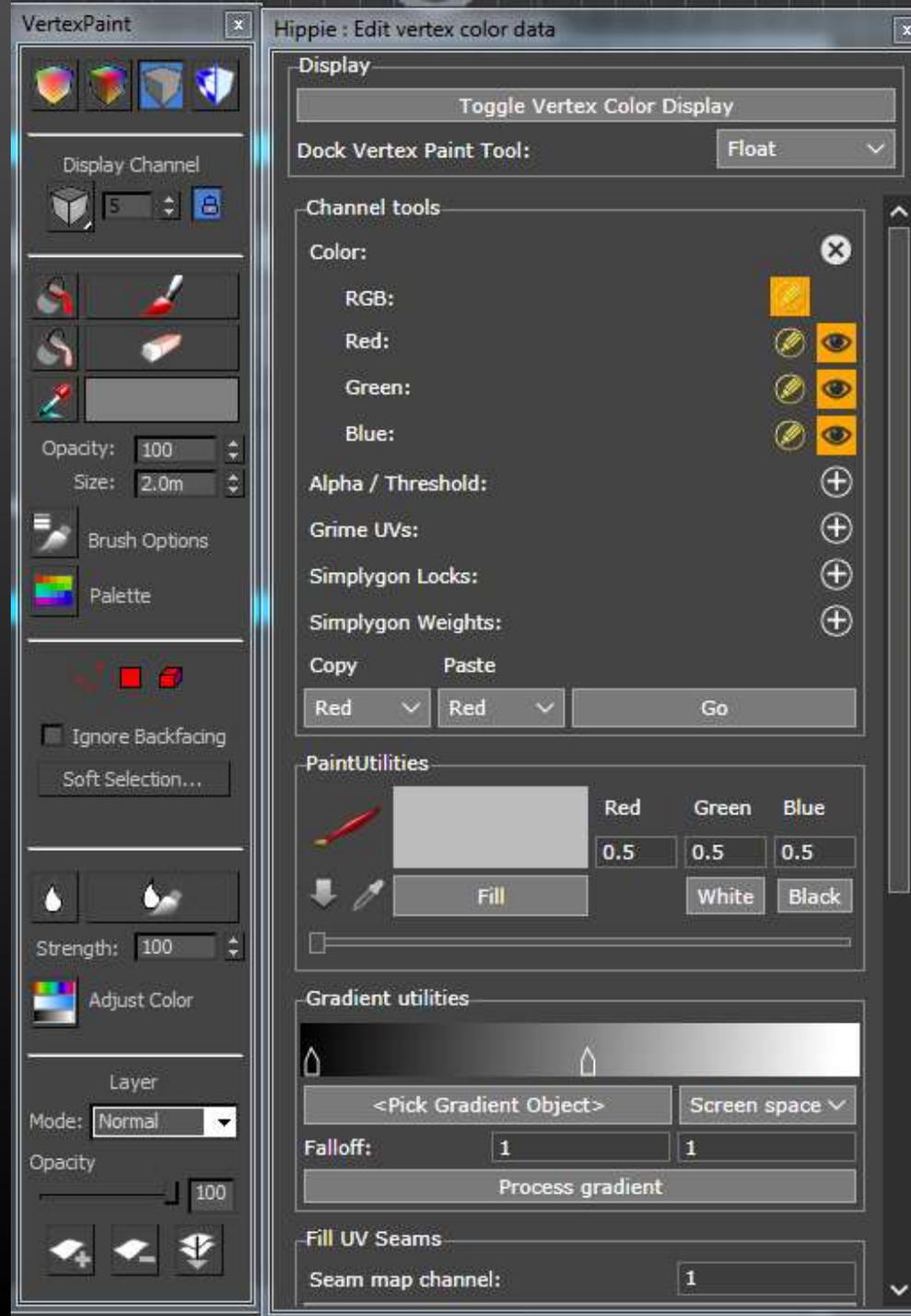
# Vertex Color



# Problems

- Not artist friendly
- Fully numerical, no visual color representation
- Minimal control and flexibility
- Existing application tools were ignored
- Inconsistent workflows between applications

# Vertex Color Tool - 3D Studio Max



# Vertex Color Tool - Maya

Tool Settings

Paint Vertex Color Tool Reset Tool Tool Help

**Brush**

Radius(U): 21.8709

Radius(L): 0.0010

Opacity: 1.0000

Accumulate opacity

Profile: 

Rotate to stroke

**Color**

Operation:  Replace  Smooth  Remove  
 Add  Subtract  Scale

Paint:  Vertex  Vertex face  Face

Channels:  RGB  RGBA  A

Color value:  

Alpha value: 1.000

Paint clamp:  Lower  Upper

Clamp values: 0.0000  1.0000

**Alpha Tools**

Flood

**Stroke**

**Stylus Pressure**

**Attribute Maps**

**Display**

Display

Toggle Vertex Color Display

Launch Component View

**Channel tools**

Add Vertex Color Property

Split Channels

Current Channel: Red

Copy: Red  Paste: Red  Go

**PaintUtilities**

  Red: 0.5 Green: 0.5 Blue: 0.5

Replace  Add  Scale  Smooth

RGB  Flood

**Gradient utilities**

Replace  Add  RGB

Apply Color Based on Soft Selection

**Morph baking**

<Pick source> <Pick target>

RGB to:  YZX - Maya Default

Bake

Force no movement on selected

**Map Baking**

256  Bake current color to texture map

Bake from texture map



Platform Agnostic Code

UI

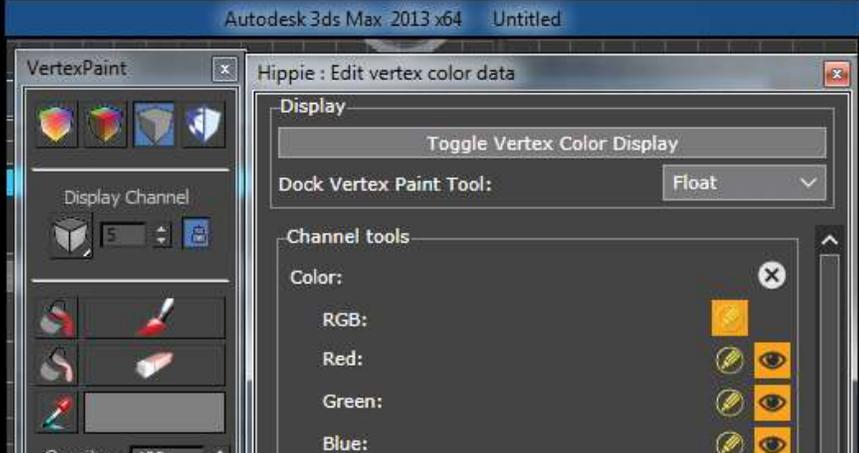
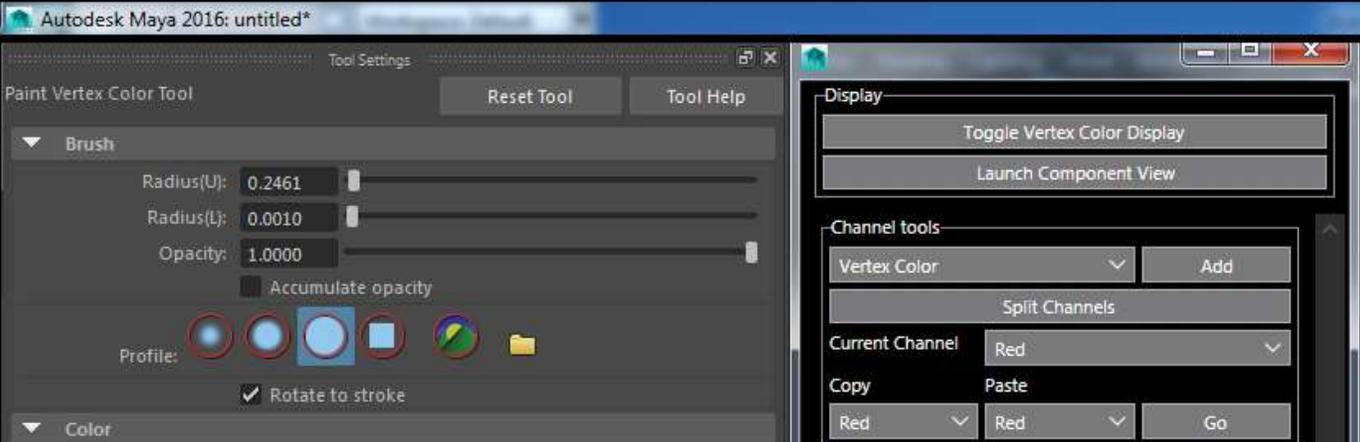


Application Specific Code



Maya

3D Studio Max



# Sharing Tools Across Applications

- Workflow familiarity
- Easy transition between applications
- Less tool support required
- Still able to customize based on application

# Metadata

Data that serves to provide context or additional information about other data

# Metadata in Tools

- Save information about the content being worked on
  - General info about the asset
  - Progress on the asset
  - Number of iterations
  - Who has worked on the asset
  - Tool revisions
  - Scene hierarchy
  - History

# Why is this useful?

- Even if functionality exists for a task, rewriting that functionality as a proprietary tool for your specific pipeline is beneficial due to metadata
- Metadata can help developers quickly obtain relevant information about the asset being worked on
- Allow quick queries and sorting of game assets
- Increased automation possibilities
- Allow for batching of changes or fixes for content
- Make bug fixing easier

# Example

- Content management
  - Tools for opening an assets in Maya
    - Connect to source control
    - Talk to other tools
    - Set default settings based on the mesh type - environment, character, vehicle, etc.
    - Know current development progress and track scheduling of the asset – base mesh, production mesh, fixing a bug, etc.
  - Tools for exporting assets to Game
    - Connect to source control
    - Check for issues with setup
    - Give budget estimates
    - Organize file structure

# How?

- External databases
- Hidden UI elements
- Properties on the file
- Network nodes in Maya
- On the content itself

# Storing information in unexpected places

- UV channels can store float2 values for each vertex
- Vertex color channels can store float3 values for each vertex
- 3 mono maps can be stored in a single RGB map
- curve data can be saved on generic attributes
- custom tool settings can be saved as attributes on empty scene nodes in Maya

# Some specific examples

- Storing material blending amounts in a UV channel
- Storing health multipliers in vertex color
- Storing vertex offsets in vertex color
- Storing the current opened tabs of a tool as an attribute on an asset in Maya
- Tracking how many times a specific mesh is placed in an engine for analytics