3ds max 7
New Features and Production Workflow

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Objectives

After completing this chapter, you should be able to:

- Model procedurally with Edit Poly.
- Subdivide using Turbo Smooth.
- Generate a Reactor Cloth solution.
- Use the Skin Wrap modifier.
- Use Preserve UV inside the Edit Poly modifier.

Introduction

This chapter concentrates on many of the new modeling features and techniques found in 3ds max 7. You start modeling a cape and a pendant for a completed knight model. You model two capes: a low-poly version using Editable Poly and a high-poly version using Edit Poly and Turbo Smooth. The low-poly version acts as a template for the high-poly version. Edit Poly procedurally adds detail to the cape while Turbo Smooth generates a high-poly version of the cape.

You use Reactor to calculate the low-poly version of the cape to fit over the knight’s shoulders. The Skin Wrap modifier is then added to the high-poly version of the cape and it uses the low-poly version to access the Reactor solution. This way you don’t recalculate the Reactor solution for the high-poly version of the cape.

Finally, you use Preserve UVs to add geometry to the hips of the knight and maintain the knight’s UVW coordinates.
Modeling the Low-Poly Cape

Starting with a Plane

1. Open knightCape01.max.
2. On the command panels, choose Create > Geometry > Plane.
3. In the Top viewport, create a Plane.
4. In the Parameters rollout, set Length to 424 and Width to 215.
5. Change the Length Segs to 6 and Width Segs to 4.
6. On the main toolbar, right-click Move and set Absolute World: X: 0.0, Y: 257.0, Z: 741.0.
7. Close the Move Transform Type-In dialog.
8. In the Name and Color rollout, type Knight_GEO_LowResCape.
   This object is used to create a low-resolution version of the cape.
10. In the Top viewport, right-click and choose Convert to Editable Poly from the quad menu.
11. In the Selection rollout, choose Polygon.
12. In the Top viewport, choose the polygons on the left side of the cape and then choose Delete.

**Tip:** F2 is the keyboard shortcut to display Shaded Faces.

13. Save the file as `knightCape02.max`.

**Adding Symmetry**

Next, you add the Symmetry modifier to the plane object. This way, you work on half of the plane and the other half is affected automatically.

1. Continue from the previous exercise, or open `knightCape02.max`.

2. Exit Polygon Sub-object.

3. Make sure Knight_GEO_LowResCape is selected.

5. In the Parameters rollout, turn off Slice Along Mirror.

If you move a vertex across the center line, you’ll know to fix it. If you let Symmetry do the slicing, then incorrect subdividing results can occur when MeshSmooth or Turbo Smooth are added.

6. In the Modify Stack display, choose Editable Poly.

7. In the Modify Stack display toolbar, turn on Show End Result.

You want to see the effect of the Symmetry modifier while you model at the base level.

8. Press 2 to enter Sub-Object Edge.

9. Adjust one of your viewports to a User viewport.

10. In the User viewport, choose edge 4 behind the Knight’s right shoulder.

11. You begin to copy edges by using SHIFT+Move to create the cape.

12. In the Top or User viewport, SHIFT+Move edge 4 on the Y-axis to create a new edge above the shoulder.
13. SHIFT+Move another edge down and forward to appear in front of the shoulder.

14. Press A to turn on Angle Snap.
15. Press E to choose Rotate.
16. SHIFT+Rotate the selected edge −90 on the Y-axis.
17. Move the rotated edge toward the center of the character.
18. Select the edge behind the character’s head and move it away from the character.

This helps form where the cape will hang down in the back.

19. Press 1 to choose Sub-Object Vertex.

20. Move the vertices to form over the Knight’s shoulders. Make sure the cape vertices don’t intersect with the character’s geometry.

21. Press 2 to go to Sub-Object Edge.
22. In the User viewport, select the four edges on the inside of the neck area.

23. In the Edit Edges rollout, choose the Settings button next to Extrude.

24. In the Extrude Edges dialog, set Extrusion Height to 0.0, and Extrusion Base Width to 8.0 and then press OK.
25. In the Top viewport, hold down CTRL to select the new edges.

26. In the Top and User viewport, move the edges away from the neck of the character keeping the center line intact.

27. Press 1 to choose Sub-Object Vertex.

28. Move the back vertex into position by typing 0.0 on the X-axis in the Transform Type-In.
29. Move the front center vertex into position.

30. Spend some time moving the particular vertices to get an image similar to the following one.
31. In the User viewport, choose the two vertices that have created a triangle.

32. In the Edit Geometry rollout, choose Collapse.

You modeled an edge ring around the neck opening for the cape. This helps to create the high-resolution model with folds and wrinkles.

33. Save the file as knightCape03.max.

Creating the Pendant

The next model you build is a pendant that holds the cape around the neck of the knight. You use several primitives and modifiers to create this object. Specifically, you use the Edit Poly modifier. Edit Poly retains most features of theEditable Poly object type with the added functionality of procedural modeling. This means you can add multiple Edit Poly modifiers onto your stack while modeling.
Edit Poly vs. Editable Poly

<table>
<thead>
<tr>
<th>Feature</th>
<th>Edit Poly</th>
<th>Editable Poly</th>
</tr>
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<tbody>
<tr>
<td>Procedural Modeling</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Sub-Object Animation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Animation with Cage</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Preserve UVs</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SHIFT+Move to Copy</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Paint Deformation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Vertex Properties</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Subdivision Surface</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Soft Selection</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

1. Continue from the previous exercise, or open *knightCape03.max*.

2. On the command panels, choose Create > Geometry > Extended Primitives > Oil Tank.

3. In the Front viewport, create an Oil Tank.

4. In the Parameters rollout, set the following values:
   - **Radius**: 10.0
   - **Height**: 8.0
   - **Cap Height**: 3.5
   - **Sides**: 24
5. In the Name and Color rollout, type `Knight_GEO_pendantCenter`.

6. On the main toolbar, right-click Move and set Absolute World: to X: 0.0, Y: -46.0, and Z: 680.0. Close the Transform Type-In dialog.

7. In the Top viewport, create a ChamferBox with the following values:
   - Length: 1.6
   - Width: 10.0
   - Height: 18.0
   - Fillet: 0.2
   - Length Segs: 1
   - Width Segs: 3
Height Segs: 4
Fillet Segs: 1

8. In the Name and Color rollout, type `Knight_GEO_pendantTop`.

![Image of modeling settings]

9. 🙂 On the main toolbar, click Quick Align.

**Note:** Quick Align aligns objects based on their pivot points.

10. In the Front viewport, choose `Knight_GEO_pendantCenter`.

11. In the User viewport, move the box approximately 2.8 units on the Z-axis.

12. On the command panels, choose Modify.

14. In the Parameters rollout, set the Amount to 0.72.


16. Press 1 to get to Sub-Object Vertex.

17. In the Edit Geometry rollout > Constraints drop-down list, choose Edge.

18. On the main toolbar, turn on Percent Snap Toggle.
19. In the Front viewport, select all vertices in the two vertical center rows and scale them 240% on the X-axis.

20. On the main toolbar, choose Paint Selection Region from the selection flyout.

   **Note:** Paint Selection allows you to click and drag to select the specific sub-object option.

21. In the Front viewport, click and drag to select all vertices in the three horizontal middle rows.

22. In the User viewport, scale them 170% on the Z-axis.

23. Press 4 to go to Sub-Object Poly.

24. In the Front viewport, choose the two polygons in the front center of the object.

25. In the Edit Polygons rollout, choose the Settings button next to Bevel.
26. In the Bevel Polygons rollout, set the Height to –0.3 and the Outline Amount to –0.3 and press OK.

27. Press the Settings button next to Extrude.

28. In the Extrude Polygons dialog, set the Extrusion Height to –0.5 and press OK.

29. Save the file as `knightCape04.max`.

**Finishing the Pendant**

You create the rest of the pendant by creating clones using Array.

1. Continue from the previous exercise, or open `knightCape04.max`.

2. Make sure Knight_GEO_pendantTop is selected and you have exited every sub-object.

3. On the main toolbar, choose Pick from the Reference Coordinate System drop-down list.

4. In the Front viewport, choose Knight_GEO_pendantCenter.

5. On the main toolbar, choose Use Transform Coordinate Center from the flyout.

6. This allows the Pendant Top to use the Pivot Point of the Pendant Center for transforms.

7. Make sure Knight_GEO_pendantTop is selected.
8. On the menu bar, choose Tools > Array.
9. In the Array dialog > Incremental area, set Z Rotation to 90.
10. In the Type of Object group, make sure Instance is chosen.
11. In the Array Dimensions group, set 1D Count to 4.
12. In the Preview group, turn on Preview.

You are able preview the result of the array before accepting the settings.

13. Press OK to accept the settings and create additional pendant pieces.
14. In the User viewport, choose Knight_GEO_pendantTop02.
15. On the Modify panel > Modify Stack display toolbar, choose Make Unique.
16. This option changes the object from an Instance to a Clone. Now you can add modifiers to this object and not affect other objects.
17. On the Modifier List drop-down, choose X-Form.
18. On the main toolbar, choose Scale.
19. On the main toolbar, set the Reference Coordinate System to Local.
20. In the Front viewport, Scale the gizmo 140% on the Z-axis.

Creating the Back of the Crest

You start with a Chamfer Cylinder and then add Edit Poly to create the Crest.

1. Continue from the previous exercise.

2. In the Front viewport, create a Chamfer Cylinder with the following values:
   - Radius: 19.0
   - Height: 1.5
   - Fillet: 0.3
   - Sides: 32
   - Cap Segs: 2

3. In the Name and Color rollout, type Knight_GEO_pendantBack.
4. On the main toolbar, right-click Select and Move and set the Absolute World to: X: 0.0, Y: -44.0, and Z: 680.0. Close the Transform Type-In.

6. Press 2 to choose Sub-Object Edge.
7. In the Selection rollout, turn on Ignore Backfacing.
8. In the Front viewport, select one edge of the cap in the front of the object.
9. In the Selection rollout, choose Loop.

This selects all the edges in a loop around the top of the cylinder.

Tip: To display selected objects only, use Isolate mode, ALT+Q, while not in any sub-object mode.
10. On the main toolbar, set the Reference Coordinate System to View.
11. In the User viewport, scale the edges 140% on the X and Z-axes.

12. In the Edit Edges rollout, choose the Settings button next to Chamfer Edge.
13. In the Chamfer Edges dialog, set Chamfer Amount to 0.5 and press OK.

14. Press 4 to get to Sub-Object Polygon.
15. Make sure Ignore Backfacing is on.
16. On the main toolbar, choose Paint Selection Region from the flyout.
17. On the main toolbar, choose the Selection Object tool.
18. In the User viewport, select the Polygons as shown in the following diagram.

Tip: If you right-click the Paint Selection Region icon on the main toolbar, the Preferences Settings dialog is displayed, allowing you to change the size of the Paint Selection Brush.

19. In the Edit Polygon rollout, choose the Settings button next to Bevel.

20. In the Bevel Polygons dialog > Bevel Type group, choose By Polygon.
21. Set the Height to −0.4 and the Outline Amount to −0.4 and press OK.

Creating the Ribbon

You use the Torus Knot to create the ribbon for the pendant. To add geometry to the Torus Knot, you use Turbo Smooth, which is an optimized version of Mesh Smooth. This modifier displays incredible speed while performing viewport operations.

Before you continue to embellish the pendant, familiarize yourself with the difference between Mesh Smooth and Turbo Smooth.
Turbo Smooth vs. Mesh Smooth
Chapter 1: Modeling a Cape and Pendant

Note: Isoline display hides all edges in the result that are indirectly descended from an original edge.

Turbo Smooth produces a TriMesh output, rather than a PolyMesh. Like Mesh Smooth, the only way to get this display to work is to actually hide all these edges, which means that the output suffers if converted into polygons. Turn on Isoline when Turbo Smooth is the last modifier in the stack.

Note: Explicit Normals indicates that Turbo Smooth should produce Explicit Normals in the result. These are normals set to particular values.

This option is unavailable in MeshSmooth. Its purpose is to improve display speed: the Turbo Smooth modifier can actually compute normals for its output faster than the standard method the mesh uses to compute normals from smoothing groups. Consequently, if the Turbo Smooth result is used directly for display or rendering, it will generally be faster using this option. (The quality of the normals will also be slightly higher.) However, if the user has topology-affecting modifiers on top of the Turbo Smooth, such as Edit Mesh or Edit Poly, these normals will be lost and new ones computed. This means that overall, there would be a net performance hit if explicit normals were computed. There is no point in computing normals at the Turbo Smooth level if you add a modifier on top and essentially remove the normals. Ultimately, you want to use this option when Turbo Smooth is the last modifier in the stack.

Other Important Turbo Smooth Differences

- Quickly apply subdivision over any arbitrary mesh.
- Twice as fast as Mesh Smooth and can be faster in some cases.
- Produces a TriMesh Output.

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<th>Turbo Smooth</th>
<th>Mesh Smooth</th>
</tr>
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<tr>
<td>Subdivision Method</td>
<td>NURMS</td>
<td>Classic, Quad, NURMS</td>
</tr>
<tr>
<td>Sub-Object</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Iterations</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Smoothness</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Render Values</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Isoline Display</td>
<td>Yes (see note)</td>
<td>Yes</td>
</tr>
<tr>
<td>Explicit Normals</td>
<td>Yes (see note)</td>
<td>No</td>
</tr>
<tr>
<td>Surface Parameters</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Soft Selection</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Typical Turbo Smooth Workflow

- Create parametric object.
- Convert object to a surface type such as Poly or Mesh. Alternatively, add either an Edit Mesh or Edit Poly modifier.
- Edit the object to build the desired 3D model.
- Add Turbo Smooth to subdivide the surface.

1. Continue from the previous exercise.

2. On the Create panel, choose Create > Geometry > Extended Primitives > Torus Knot.

3. In the Front viewport, create a Torus Knot with the following values:
   - Base Curve:
   - Radius: 5.2
   - Segments: 52
   - Cross Section:
   - Radius: 5.2
   - Sides: 6
   - Eccentricity: 0.65
   - Lump Height: 0.28
   - Lump Offset: 37.0

4. In the Name and Color rollout, type Knight_GEO_pendantKnots.

5. Right-click Select and Move and set the Absolute World to X: –21.0, Y: –41.0, Z: 684.0.

7. In the User viewport, Scale the gizmo down 40% on Y-axis and up 150% on the Z-axis.

8. Press E to choose Select and Rotate and Rotate the gizmo 15° on the Y-axis.

   **Tip:** Type A on the keyboard to turn on Angle Snap and constrain the rotation in five-degree increments.


10. In the Modify Stack display, open Mirror and choose Sub-Object Mirror Center.

11. Right-click Select and Move, and set Absolute World: X: 0.0.

12. In the Parameters rollout > Options group, turn on Copy.


Tip: Do not drag the spinner for the Iterations value.

Creating a Point Helper and Linking

Next, you create a Point Helper object to act as the Parent to all parts of the pendant. You use Select and Link to create a hierarchy.

1. Continue from the previous exercise.
2. Exit the Isolation mode.
3. On the command panels, choose Create > Helpers > Point.
4. In the Parameters rollout, turn on Box, and leave Cross on and Size 20.
5. In the Top viewport, click anywhere to create the Point Helper.
6. On the main toolbar, choose Align and then choose Knight_GEO_pendantCenter.
7. In the Align Selection dialog, turn on X, Y, and Z Position.
8. Turn on Pivot Point for both Current and Target Object. Click OK.

9. In the Name and Color rollout, type Knight_HLP_pendant.
10. Press H and choose all Pendant parts.
11. On the main toolbar, choose Select and Link.
12. In the Front viewport, click and drag from the child to the parent Helper Object (Knight_HLP_pendant).
13. Rotate and Move the Point Helper so the pendant appears to be resting on the character’s chest.
14. Save the file as knightCape05.max.

**Modeling the High-Resolution Cape**

Next, you model a high-resolution version of the cape. This will be used for the Skin Wrap modifier later in the chapter. You use Edit Poly to procedurally model changes to the cape, and Turbo Smooth to subdivide the geometry.

1. Continue from the previous exercise, or open knightCape05.max.
2. Select Knight_GEO_LowResCape.
3. On the menu bar, choose Tools > Snapshot.
4. In the Snapshot dialog > Clone Method group, choose Copy. Press OK.

5. Right-click and choose Hide Selection from the quad menu to hide Knight_GEO_LowResCape.
6. Select Knight_GEO_LowResCape01 and rename it Knight_GEO_HighResCape.
7. On the Modifier drop-down list, choose TurboSmooth.
8. In the TurboSmooth rollout > Main group, set Iterations to 2 and turn on Isoline Display.
   Only the main edges are displayed.
9. In the Modify Stack display, choose Editable Poly.
11. In the Edit Poly Mode rollout, turn on Show Cage.

This option shows the object based on this level of the stack. Notice that when you add an Edit Poly modifier, Show End Result is on automatically.

To make a higher-poly cape, spread the edge loops around the neck of the cape so that you can cut the geometry and then add wrinkles.

12. Press 2 to enter Sub-Object Edge.
13. In the User viewport, select an edge perpendicular to the ring of the neck.


15. In the Edit Edges rollout, choose the Settings button next to Connect.

16. Change the Connect Edge Segments to 2 and press OK.

17. Press 1 to go to Sub-Object Vertex.

**Tip:** Holding down CTRL while choosing another sub-object selection creates the selection based on the previous sub-object selection.
18. Model the new vertices into a fold sticking up from the top of the cape.

19. In the User viewport, choose Edge 54.

20. In the Selection rollout, choose Ring.

21. Choose the Settings button next to Connect and add two new Edge Loops.
Use the new vertices to model another fold.

22. Save the file as knightCape06.max.

Adding More Detail

You continue modeling the high-resolution cape by adding details for the folds.

1. Continue from the previous exercise, or open KnightCape06.max.
2. Make sure Knight_GEO_highResCape is selected.
3. In the Modify Stack display, choose Edit Poly.
5. In the Edit Poly Mode rollout, turn on Show Cage.
6. Turn off Show End Result.
7. Select the edge rings that cross the shoulder portion of the cape.

8. Choose the Settings button next to Connect and set the Connect Edge Segments to 1 and press OK.

9. Edit the new vertices to make the cape look more natural as it curves over the shoulders of the character.
10. Exit Sub-Object.
12. Turn on Show Cage.
13. In the User viewport, select the two edges at the end of the Cape and press Ring in the Selection rollout.

14. Choose the Settings button and set the Connection to 1.
15. Edit the vertices to make the final cape model look similar to the following image.

16. Save the file as *knightCape07.max*.

**Using Reactor**

In this section, you drape the cape over the back of the character using Reactor. You use the low-resolution cape with the low-resolution character to solve the reactor cloth solution. You then use the Skin Wrap modifier on the high-resolution cape model and reference the low-resolution model. This approach assists the animation setup and makes the cape look natural as it hangs from the character.

You use the following three Reactor components:

- Cloth Collection and Modifier for the cape.
- Deforming Mesh Collection for the collision object on the low-resolution body.
- Rigid Body Collection as an anchor. This determines how the front of the cape drapes the chest.
1. Continue from the previous exercise, or open *KnightCap07.max*.

2. Unhide the low-resolution character and cape and hide the high-resolution character and cape.

3. Select *Knight_GEO_LowResCape*.

4. Move the cape if it intersects the low-resolution model.

   **Note:** You might also want to add more edge loops across the shoulder area to make sure there are enough vertices to collide with the character. You can first make the solution and see the result before you start adding more geometry.

5. On the Reactor toolbar, choose Apply Cloth Modifier.

6. In the Modify Stack display, make sure the reactor Cloth modifier is on top of the stack.
7. On the Reactor toolbar, choose Create Cloth Collection. This adds a Cloth Collection object in the viewport and has added the Cape to its Properties.

8. In the User viewport, choose Knight_GEO_BodyLowRes.

9. From the Reactor toolbar, choose Create Deforming Mesh Collection. A Deforming Mesh Collection object is created in the viewport and the low-resolution mesh is added to its Properties.

10. In the User viewport, choose Knight_GEO_pendantCenter.

A Rigid Body Collection object is created and the Pendant is added to its Properties.


Note: If you get an error stating there are interpenetrations, go to the cape and make sure no vertices have collided with the body of the character.
13. If there are no interpenetrations then a Reactor Real Time Preview dialog is displayed.

14. You may use your Left and Middle mouse buttons to navigate the preview window until you see the cape.

15. Press P to Play the simulation.

You see the cape collide with the character and drop down. You need to constrain the front of the cape to the pendant so the cape stays on the character.

16. In the User viewport, choose Knight_GEO_LowResCape.

17. In the Modify Stack display, open the Reactor Cloth modifier and choose Sub-Object vertex.
18. In the Perspective viewport, choose the vertices at the front of the cape behind the pendant.

19. On the Modify panel > Constraints rollout, choose Attach To Rigid Body.

A new entry is displayed in the list.
20. In the Constraints rollout, choose Attach to Rigid Body from the list. An Attach to RigidBody rollout is displayed.

21. In the Attach to Rigid Body rollout, choose None.

22. In the User viewport, choose Knight_GEO_pendantCenter. The selected vertices are constrained to the pendant.

23. In the Reactor toolbar, choose Preview Animation.
**Note:** If you didn’t add geometry around the shoulder area you notice the cape does not form nicely. Spend time to add some geometry by adding an Edit Poly modifier above the Editable Poly object type and then make another Preview.

**Tip:** You might have to reselect the vertices in the Reactor Cloth modifier.

You need to give the cloth time to settle. The way to do this is to increase the total number of frames in your animation from 100 to 500. You then use the Utility panel to access Global controls for Reactor.

24. In the Time Controls, choose Time Configuration.

25. In the Time Configuration dialog > Animation group, set Length to 500.


27. In the Utilities rollout, choose reactor.
28. In the Preview & Animation rollout, make sure the End Frame is set to 500.

29. In the World rollout, set the Col. Tolerance to 6.

This keeps the cape from passing into the low-resolution character.

30. In the Preview & Animation rollout, choose Create Animation.

31. In the reactor dialog, choose OK.

32. It takes a few minutes to calculate the animation.

33. In the Time Controls, choose Play.
34. The cloth does not completely settle. You fix this by changing the Air Resistance to stop the cape sooner.

35. Select the low-resolution cape.

36. On the Modify panel > Properties rollout, set the Air Resistance to 0.2.

37. In the Force Model group, set the Stiffness to 1.0 and the Damping to 0.5.

38. In the Reactor toolbar, choose Create Animation.

39. Play the animation.

The cape now comes to a rest.

40. Save the file as knightCape08.max.

Skin Wrap

Next, you use Skin Wrap. Skin Wrap is a modifier that allows you to use another object to deform a mesh. The basic workflow is as follows:
• Create two models: one low-resolution and one high-resolution.
• Make sure these two objects are on top of each other.
• Animate the low-resolution model.
• Add the Skin Wrap modifier to the high-resolution object.
• In the Skin Wrap modifier, choose the low-resolution animated object.
• Scrub the time slider and watch how the high-resolution model is animated in the same way as the low-resolution mesh without adding any keyframes.

You add the Skin Wrap modifier to the high-resolution cape and then choose the low-resolution cape as the “wrapper” or “cage” object. Since you have calculated the cloth simulation using the low-resolution models, you can simply apply that same deformation to the high-resolution case by adding a Skin Wrap modifier. This saves you from recalculating the Reactor solution with the high-resolution models.
Skin Wrap supports two types of deformation engines: Vertex and Face. It defaults to Vertex, which is weighted and therefore generates a smooth result. Vertex also has more controls than Face. Face is rigid and lacks blending, which produces an uneven result. It has only one control named Falloff.

**Note:** No options in this modifier can be animated.

1. Continue from the previous exercise, or open `knightCape08.max`.
2. Unhide and then select Knight_GEO_highResCape.
3. On the Modify Stack display, choose Symmetry.
4. On the Modifier List drop-down, choose Skin Wrap.
5. In the Parameters rollout, choose Add and then select Knight_GEO_LowResCape from the viewport.

6. In the Parameters rollout, turn on Weight All Vertices. The rest of the default values work well.

7. In the Time controls, press play. Now the high-resolution cape follows the low-resolution cape.
Making Snap Shots

Now that you have the capes draped over the character, use Snap Shot to copy both the high- and low-resolution meshes. Use Snap Shot also to remove the cloth simulation so that the cape, in its resting position, is the starting point.

1. Continue from the previous exercise.
2. In the User viewport, choose Knight_GEO_highResCape.
3. In the Modify Stack display, turn off TurboSmooth.

You don’t want to snapshot the mesh with TurboSmooth so that the poly count doesn’t go up in the model until you decide.

4. Move the time slider to frame 500.
5. Select both the high- and low-resolution capes.
6. On the menu bar, choose Tools > Snapshot.
7. In the Snapshot dialog > Clone Method group, choose Mesh and then press OK.
8. Move the time slider to frame zero.

There are two new capes without the dynamics. These are the final models.

9. Select the two original capes and press Delete.

   **Note:** You leave the dynamics icons to help you rig this character. You can reuse them for doing dynamics later.

10. Select the new high-resolution cape.

    It is converted to an Editable Mesh object type.


12. In the Main group, set Iterations to 2.

13. Press H and select the low-resolution object and reactor icons.

14. Right-click and choose Hide Selected.

15. Right-click and choose Unhide by Name.

16. Choose the high-resolution knight.

17. Save the file as `knightCape09.max`. 
Using Reactor

Using Preserve UVs

The next step is to add more edge loops to the character so that you can get better deformations in the hip area once you rig and skin this character.

Since the character is already mapped, adding geometry usually affects the UVW map coordinates. You use the Preserve UV feature built into the Edit Poly Modifier to rectify this problem.

1. Continue from the previous exercise, or open knightCape09.max.

2. Hide the Knight_GEO_BodyLowRes object.

3. In the User viewport, choose Knight_GEO_BodyHighRes.

4. In the Modify Stack display, choose Editable Mesh.

5. On the Modifier List drop-down, choose Edit Poly.

6. Press 2 to go to Sub-Object Edge.

7. In the Front viewport, select the vertical edges around the hip.

8. In the Edit Edges rollout, choose the Settings button next to Connect and leave the Connect Edge Segments set to 1.

9. In the Edit Geometry rollout > Constraints drop-down list, choose Edge.
10. In the Front viewport, move the new edges up and down.

![Image](bmc_v_edges_stretch.bmp)
Notice the existing mapping coordinates are stretched.

11. Press CTRL+Z to undo the movement.

12. In the Edit Geometry rollout, turn on Preserve UVs.

13. In the Front viewport, move the edges up and down again.
Notice how **3ds max** tries to preserve the UV coordinates. This way you can update models with little effect on the mapping.
Move the edge ring down to just above the next edge.
14. Select the edges around the hips again and press the Settings button next to Connect again.

![Image of character model with edges around the hips highlighted.]

15. Move these edges up under the belt.

16. Add one more edge loop around the center of the hips.

![Image of character model with additional edge loop added.]

When the character is animated the hips will deform better.

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**Conclusion**

This chapter concentrates on modeling in 3ds max 7. Although there are always several ways to accomplish similar tasks, this chapter focuses on poly modeling using the procedural modifier, Edit Poly, and the poly object type, Editable Poly. You also become familiar with the Turbo Smooth modifier and when to use it rather than Mesh Smooth.

The versatility of Reactor was used in a modeling situation rather than in an animation. This allowed you to easily set up the necessary components in Skin Wrap. Finally, the chapter explores Preserve UVs, an option available in both Edit Poly and Editable Poly. It proved to be a versatile option to use after a character’s UVs have been defined.