

▶ **Autodesk 3ds Max 2011 Productivity Benchmarks**

## ▶ Introduction

*This document presents key findings of a benchmarking project designed to assess the impact of the Autodesk 3ds Max 2011 on the productivity of 3D professionals.*

*In order to assess how 3ds Max 2011 compares with earlier releases, we have selected a number of key features introduced in recent releases of the program, and compared them with 3ds Max 2008.*

*Benchmarks were designed to measure how specific functions speed up everyday tasks. For details on the methodology used to conduct these benchmarks, see “About the Benchmarks” at the end of this report.*

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## ► CAT

### What is it all about?

Character rigging for film or games development is one of the most complex and time consuming processes in 3D production workflows, and this despite many attempts of software developers to ease the extremely labor intensive manual creation of IK (Inverse Kinematics) structures and bones system required for character animation.

CAT, the character animation toolkit introduced in 3ds Max 2011 builds on earlier attempts to automate this process, but it goes much further in delivering a rigging solution that even a newcomer to 3D could easily learn.

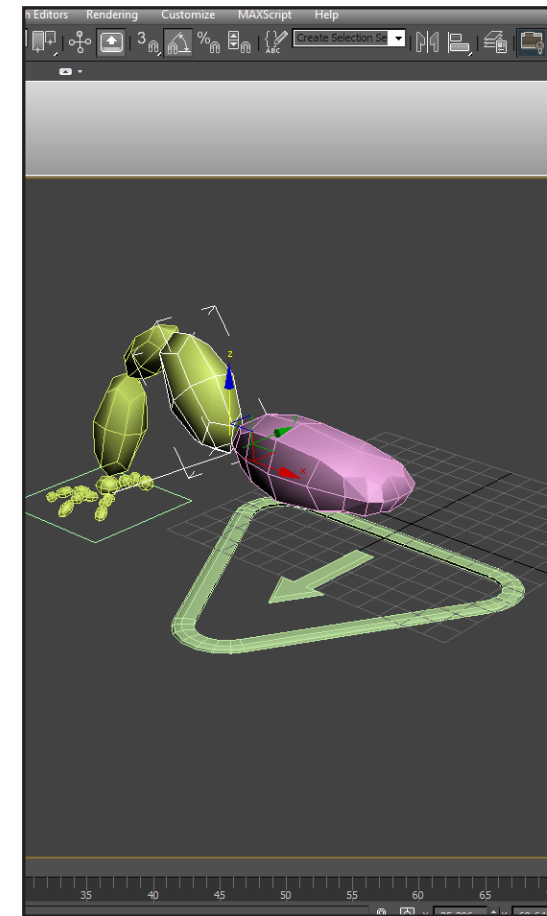
Users can start with complete, pre-built humanoids, animals, insects or fantasy creatures like dragons, and adapt them, or simply combine pre-built elements, such as legs, a spine, etc, relying on 3ds Max to automatically create and connect the IK logic built into each element.

It was using this second approach that we managed to build the complete, animation-ready bones system for the scorpion in our example in less than ten minutes.

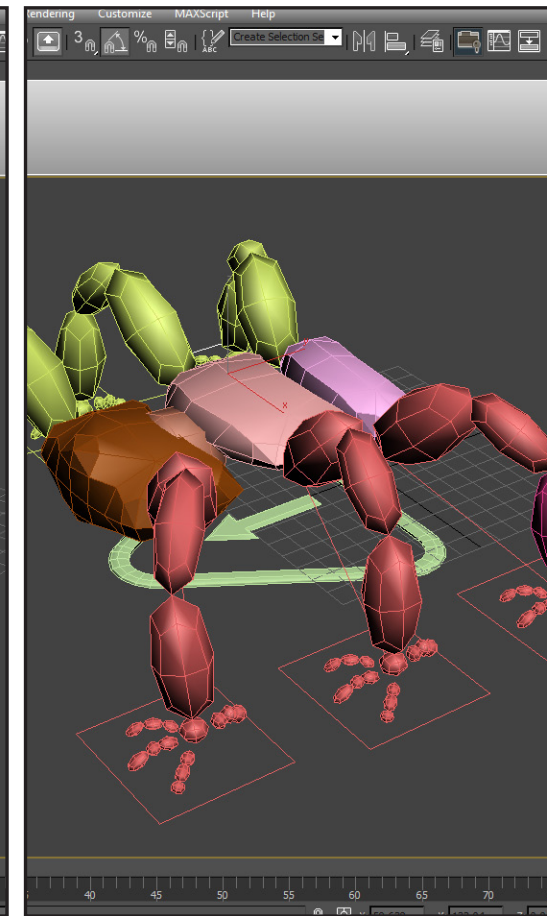
It will be fascinating to watch where expert users will take CAT, and what kind of complex creation the technology will inspire...

### The Feature

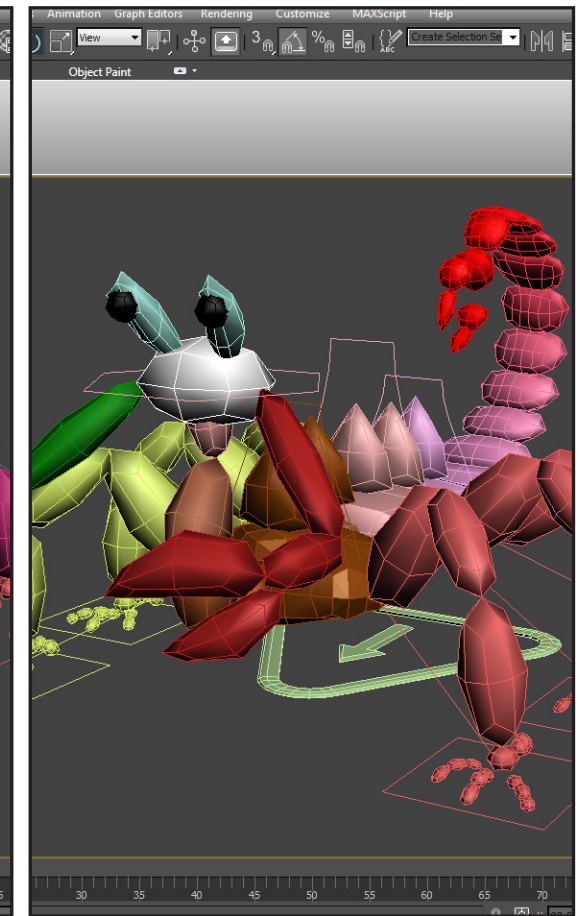
Slightly less than ten minutes were necessary to combine individual CAT elements for this example. One of the advantages of CAT is the possibility to change the shape of bones elements to closely mimic the final model.



3 minutes



5 minutes



10 minutes

### How it works

### Productivity

**3ds Max 2008**  
100% (8 min. 7 sec.)

**3ds Max 2011**  
26.60% (2 min. 10 sec.)

Our benchmarks included rigging a simple leg from scratch, and creating a complete game character with legs, spine and arms. The chart is based on the average for both tests.

Reference value: Result for 3ds Max 2008. **Shorter is better.**

**Bottom Line: CAT can save 4 hours a month.**

(Based on 2 repetitions of the average benchmarked operation per day.)

## ► Intelligent Selection Tools

### What is it all about?

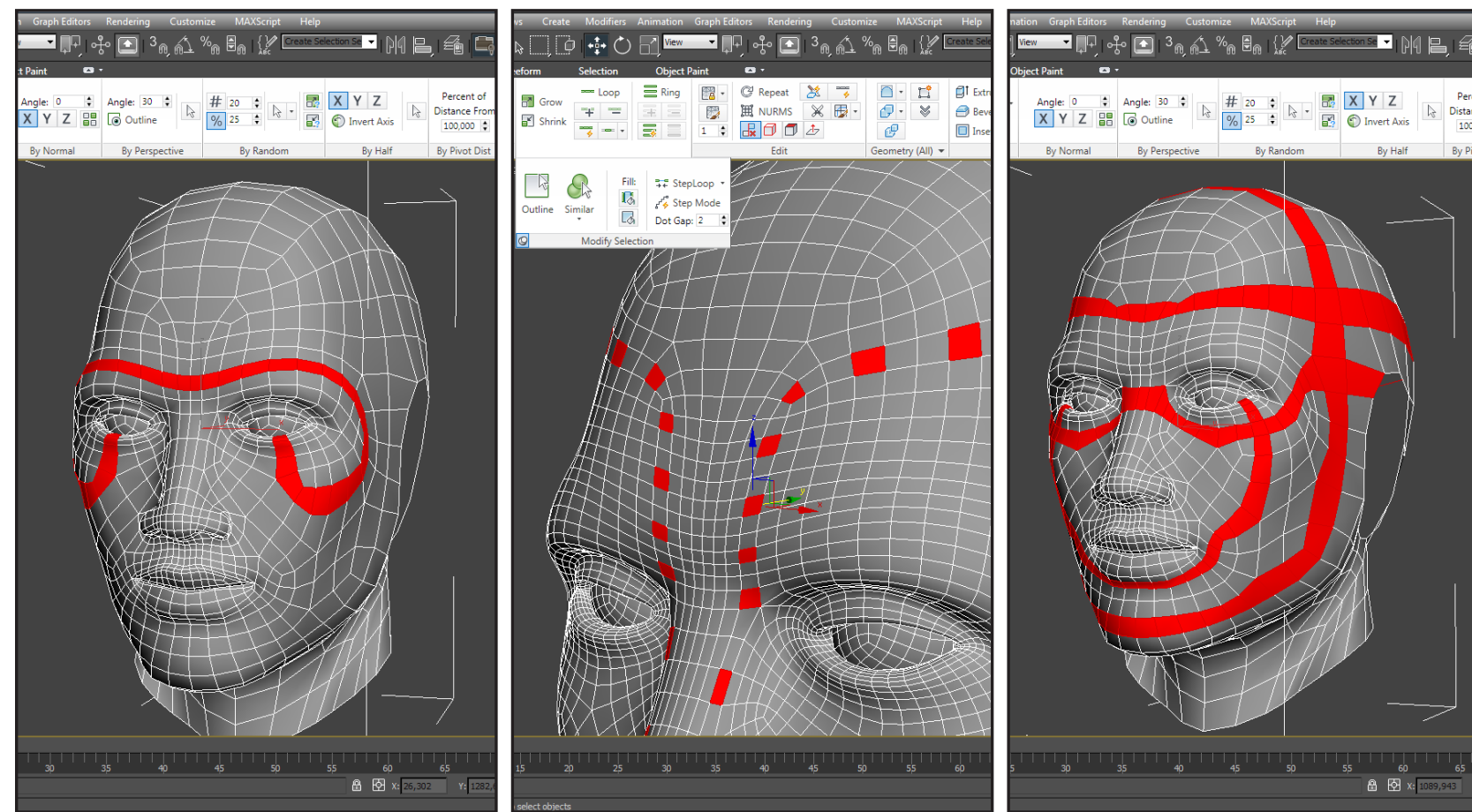
Selecting specific parts of complex polygonal models is one of the most basic and most pervasively used functions in the modeling process — and also one of the most time-consuming, since very often, the same operations need to be executed over and over again. As a result, even seemingly minor improvements in the process can lead to enormous cumulated time gains.

More specifically, we looked at the process of selecting loops and rings of edges, vertices and faces, essential in many modeling situations.

With older releases such as 3ds Max 2008, selecting loops and rings required constantly moving back and forth between the model and the tool palette, which not only wastes a lot of time, but also increases the risk of an error.

In 3ds Max 2011, the selection process has been significantly streamlined, and is generally reduced to two or three clicks. Productivity gains linked to Intelligent Selection Tools can be considerable, as the benchmarks show.

**3ds Max 2011 makes selecting loops much easier than older releases: shift-clicking two adjacent faces now selects a face loop. The program also supports “Dot Loops” and makes complex multiple selections much easier.**



### How it works

### Productivity

**3ds Max 2008**  
100% (17 sec.)

**3ds Max 2011**  
27.14% (4 sec.)

We benchmarked a variety of selection operations for this project, including selecting vertex rings, face loops, dot loops and creating multiple selections. The chart shows the average value for all benchmarks.

*Reference value: Result for 3ds Max 2008. Shorter is better.*

### The Feature

**Bottom Line: Intelligent Selection Tools in 3ds Max 2011 can save over 2 hours a month.**  
(Based on 30 repetitions of the average benchmarked operation per day.)

## ProOptimizer

### What is it all about?

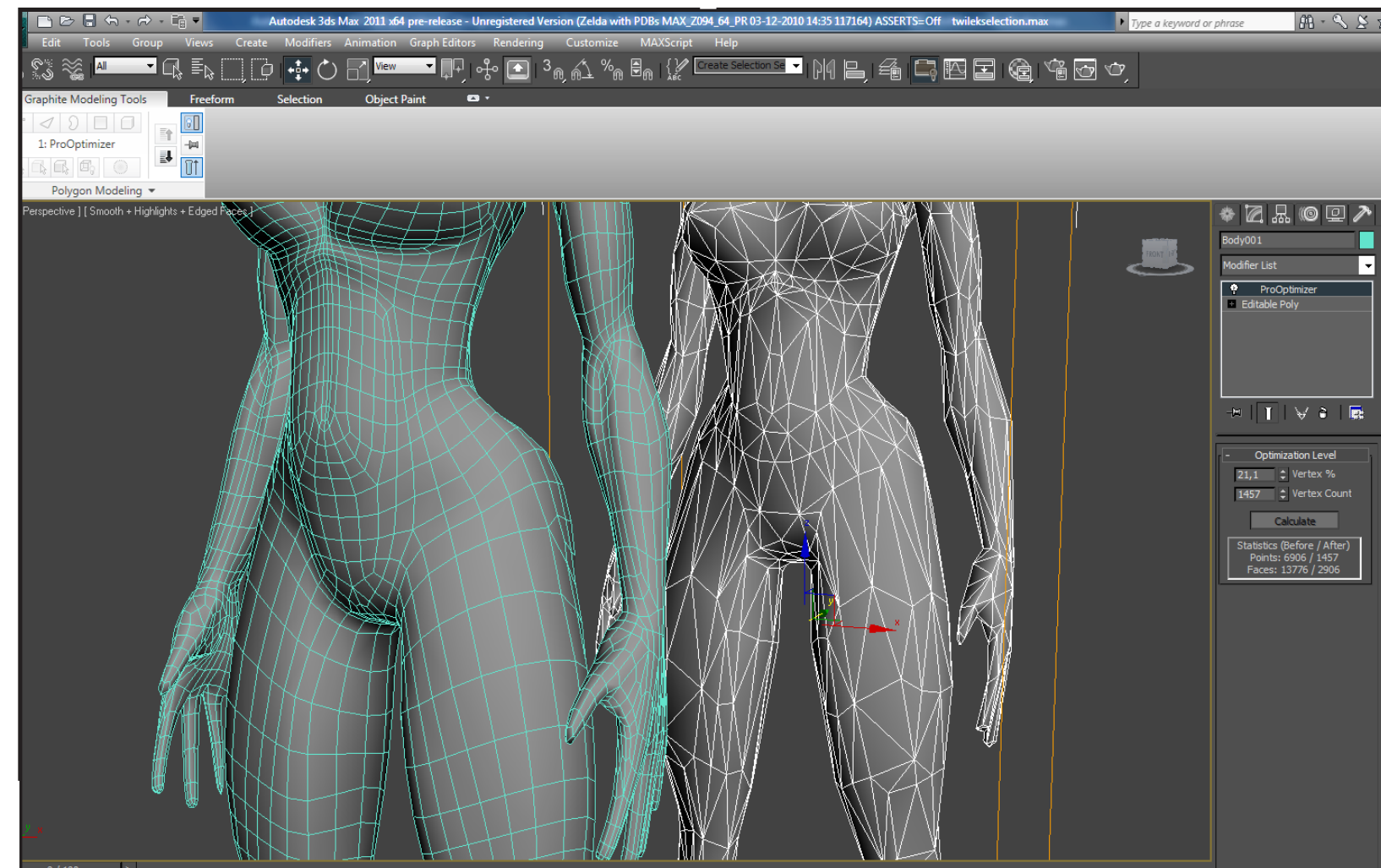
Most 3D production workflows rely heavily on polygon models that are imported either from a 3D scanner, or a specialized modeling application.

To make things more complex still, models often have to exist in a variety of different resolutions to be easily adaptable to different production situation; optimizing polygon models is therefore essential in order to maintain the aspect of a model while reducing the polygon count.

The ProOptimizer in 3ds Max 2011 has been significantly expanded over optimization options in older releases of the software. ProOptimizer allows the user to adjust optimization interactively, and maintains textures of the models, as well as a multitude of other geometry aspects such as normals.

In addition, ProOptimizer offers a host of optimization options including a Respect Symmetry option that drastically reduces the time necessary to optimize symmetrical polygon meshes.

In this example of a polygon mesh, the Respect Symmetry option has been used. In older versions of 3ds Max, working on symmetrical models such as faces and bodies required time-consuming manual selection of one half of the model, before optimizing it.



### How it works

### Productivity

**3ds Max 2008**  
100% (39 sec.)

**3ds Max 2011**  
22.01% (9 sec.)

Our benchmark measured the time necessary to optimize a character model with respect for the symmetry of the polygon mesh.

Reference value: Result for 3ds Max 2008. **Shorter is better.**

### The Feature

**Bottom Line: ProOptimizer in 3ds Max 2011 can save over 1 hours a month.**  
(Based on 4 repetitions of the average benchmarked operation per day.)

## ► Slate Material Editor

### What is it all about?

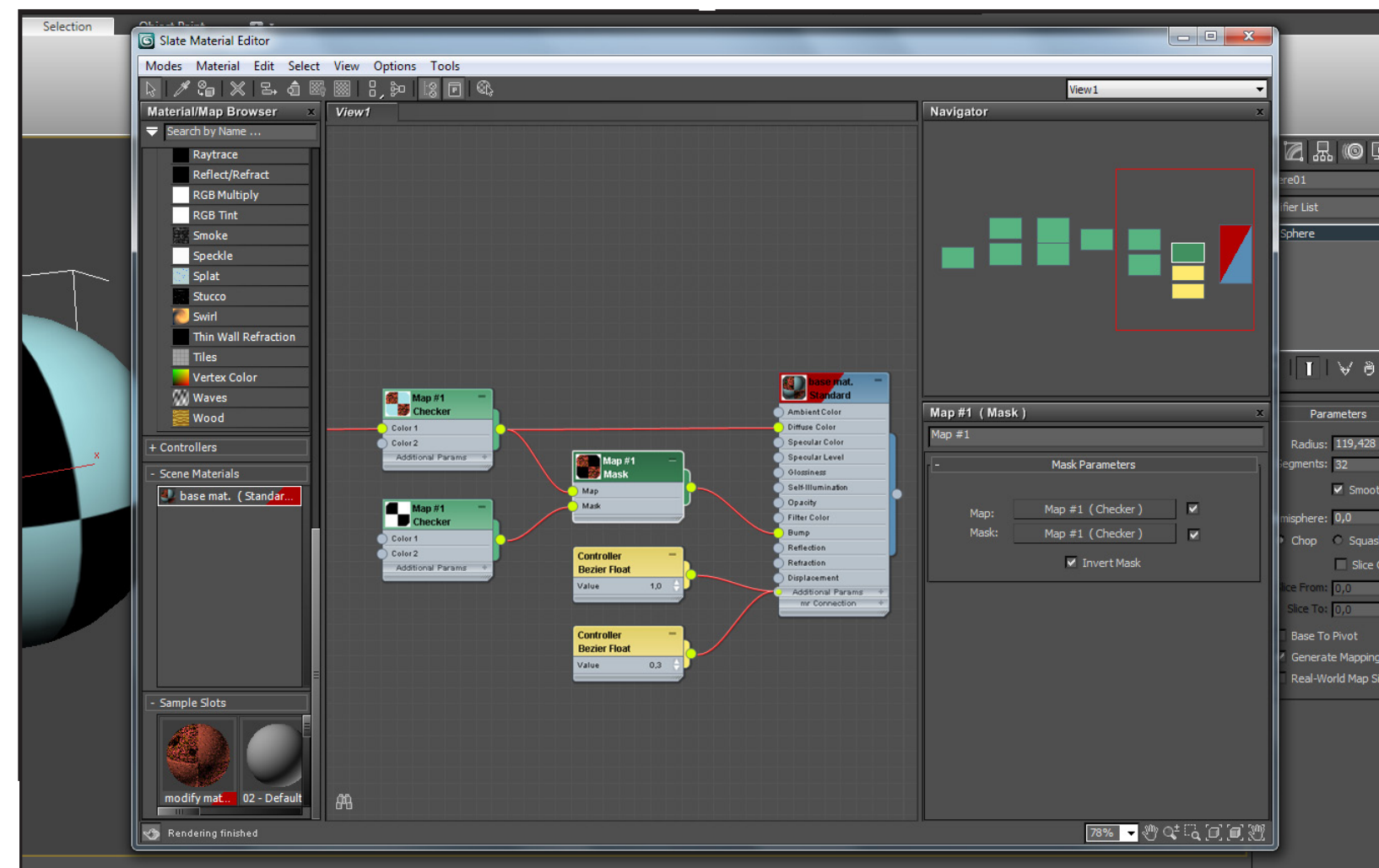
Materials and shaders are one of the most complex aspects of the 3D production environment, often combining hundreds of settings, shading attributes and maps to create the subtle affects that appear in the final rendering of a scene.

To make matters worse, many materials share some common aspects such as maps, and there usually is a sophisticated web of dependencies between the dozens or hundreds of shaders that are required for complex scenes.

This is the problem that the Slate Material Editor sets out to alleviate. It is important to note that the new module does *not* replace the standard material editor that users of 3ds Max are accustomed to: rather, the Slate Material Editor expands the pre-existing functionality by providing visual representation of the links between different attributes, and makes navigating complex materials much faster than before.

While seasoned 3ds Max users will need to familiarize themselves with the new paradigm, the productivity gains that the Slate Material Editor can provide are clearly documented in our benchmarks.

Navigating complex materials is intuitive, and linking different maps and controllers to a variety of parameters has become much simpler than in the past.



### How it works

### Productivity

**3ds Max 2008**  
100% (27 sec.)

**3ds Max 2011**  
53.60% (15 sec.)

We benchmarked several operations linked to shader management: locating and modifying several parameters in a complex shader, changing maps and colors in complex shaders. This chart shows the average productivity gain of all benchmarks.

Reference value: Result for 3ds Max 2008. **Shorter is better.**

### The Feature

**Bottom Line: The Slate Material Editor in 3ds Max 2011 can save over 2 hours a month.**  
(Based on 30 repetitions of the average benchmarked operation per day.)

## Quadrify

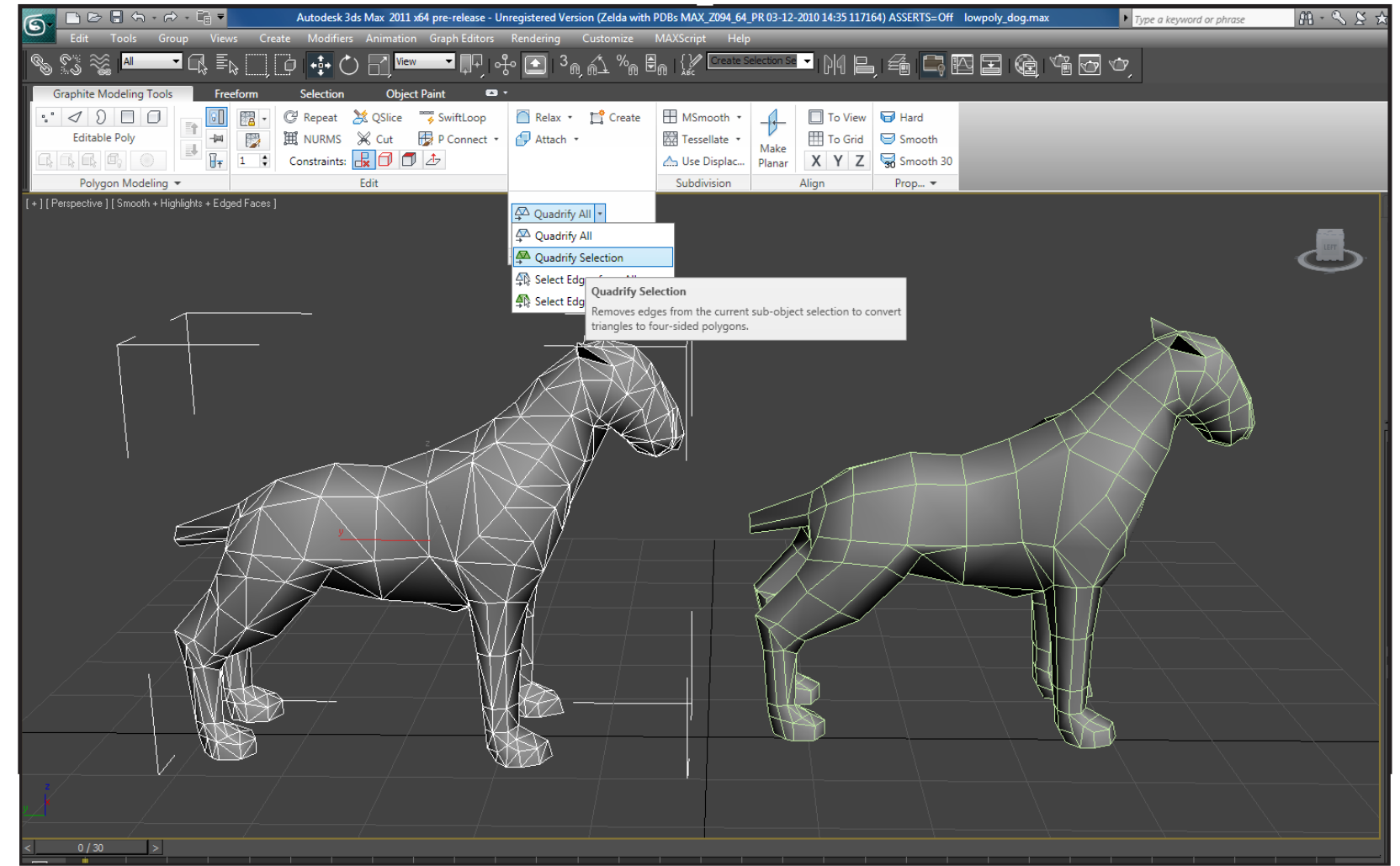
### What is it all about?

Quadrifying, that is, removing edges from a polygon mesh to transform triangles into four-edged faces, is another operation that used to be extremely time-consuming, since it needed to be executed manually: to get from model A, left in our screenshot, to model B on the right, users of older versions of 3ds Max needed to remove all the excess edges in the mesh manually, rotating the model and manually selecting every single edge that needs to be removed.

3ds Max 2011, on the other hand, automates this process, essentially reducing an operation that took ten minutes in our (simple) example to a single click.

In addition, the Quadrify option lets you protect specific edges from the optimization process — essential to make sure that components that are crucial for the animation process will still be available after the optimization of the mesh.

The Quadrify option in 3ds Max 2011 can be found on the Graphite Modeling Tools tab of the 3ds Max toolbox. Selected areas can be protected from the optimization.



### How it works

### Productivity

**3ds Max 2008**  
100% (9 min. 45 sec.)

**3ds Max 2011**  
0.45% (3 sec.)

Benchmarks of the Quadrify option compared the time it takes an experienced user to remove excess edges in the model in our screenshot.

Reference value: Result for 3ds Max 2008. **Shorter is better.**

### The Feature

**Bottom Line:** The Quadrify option in 3ds Max 2011 can save over 3 hours a month. (Based on just one execution of the average benchmarked operation per day.)

## ▶ Shift Brush

### What is it all about?

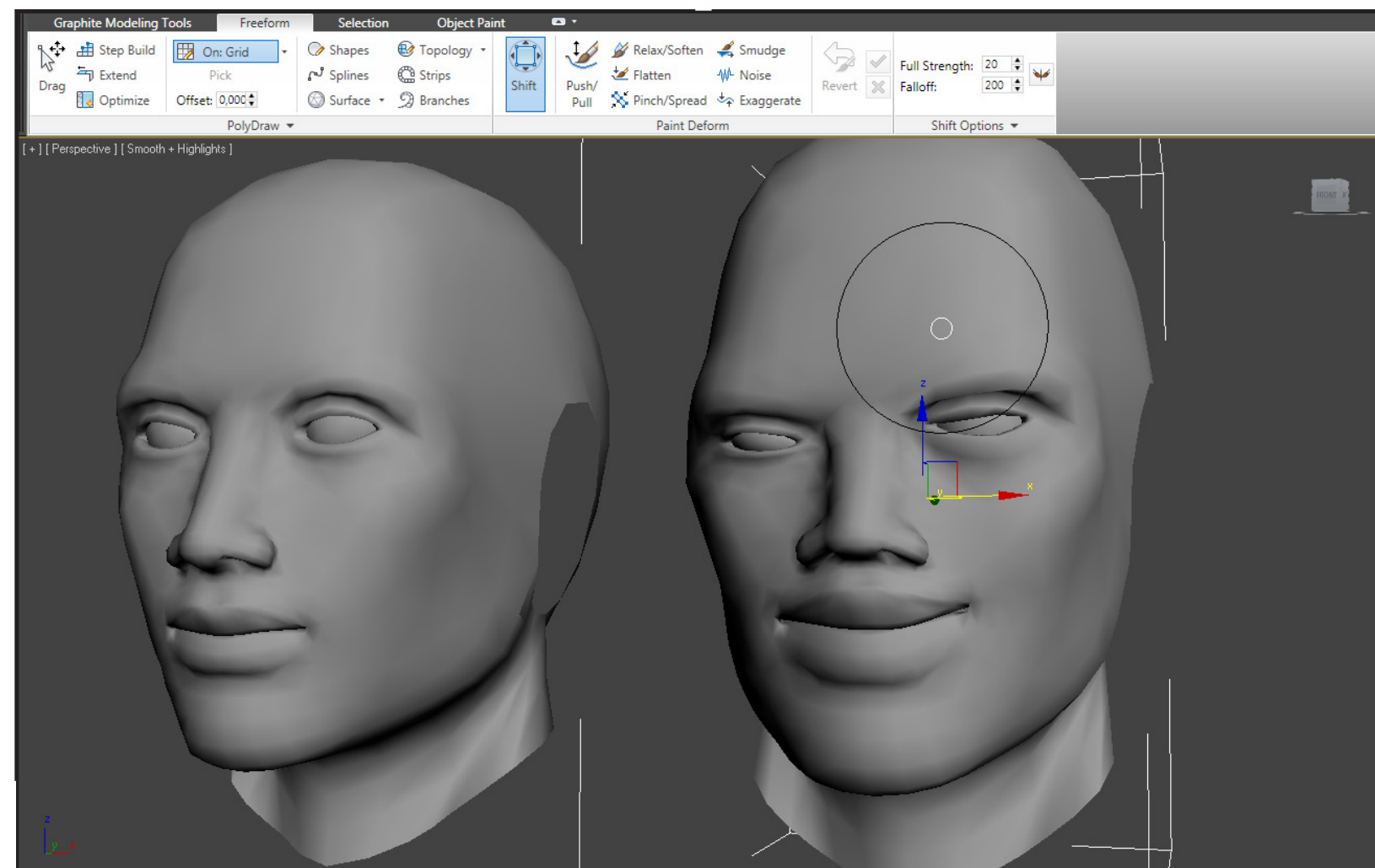
Subtle, large-scale modifications of detailed polygon models (such as changing the expression of a face, as in our example) require very sophisticated modeling tools.

Up to now, the best way of achieving these results was to use soft selections, to target a specific region of a model, and then to use scale and move functions.

3ds Max 2011 offers a much more intuitive tool for reworking models: the Shift Brush, which allows the user to apply transformations directly with the mouse.

The benefits of the new method are twofold: the Shift Brush is clearly more efficient and produces more subtle results than working with soft selections; in addition, modelers will appreciate the intuitive way of working with the new tool, that in itself can make a creative user more efficient.

The Shift Brush works more or less like a smudge tool in a paint program — but it operates in three-dimensional space and allows subtle modification that would be very hard to achieve with other tools.



### How it works

### Productivity

**3ds Max 2008**  
100% (32 sec.)

**3ds Max 2011**  
24.81% (8 sec.)

Our benchmark consisted in creating a simple deformation of a plane, using the Shift Brush in 3ds Max 2011, compared with creating a similar model with soft selections.

Reference value: Result for 3ds Max 2008. **Shorter is better.**

### The Feature

**Bottom Line: The Shift Brush in 3ds Max 2011 can save almost 1 hours and 30 minutes a month.**  
(Based on 10 repetitions of the average benchmarked operation per day.)



## ► Quicksilver

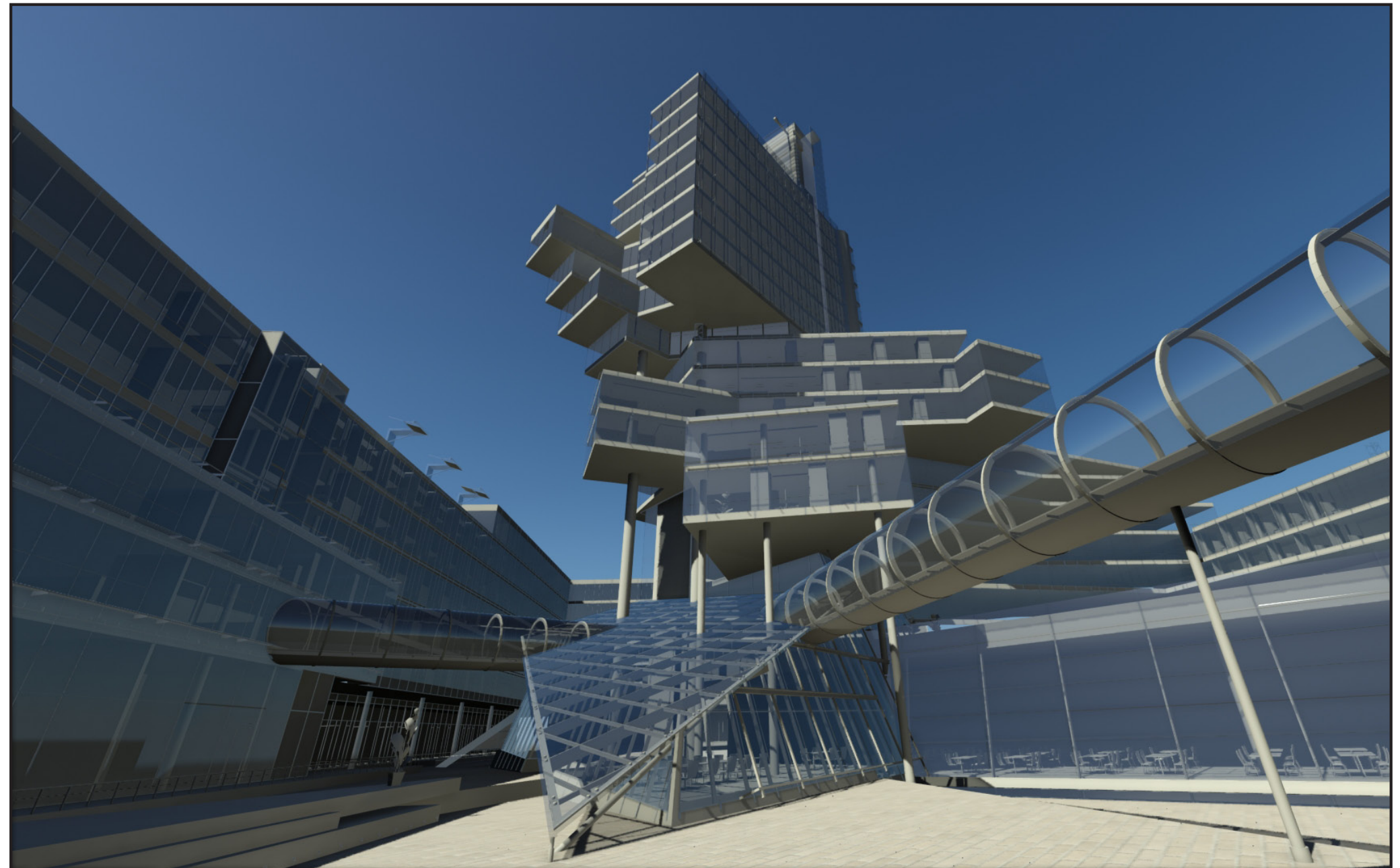
### What is it all about?

Quicksilver is a hardware rendering option that has been introduced with 3ds Max 2011, and uses the graphics processors on modern video cards to deliver higher-quality rendering at much greater speed than conventional raytracing.

Quicksilver doesn't set out to displace mental ray as the default option for superior quality image rendering; rather, it aims at delivering higher-speed rendering in workflow situations where raytraced output would be too long or costly.

The natural application for Quicksilver is the production of higher-quality animatics and draft rendering, in situations where throughput is essential.

The caveat is that Quicksilver requires some setup, and the use of specific shaders (and the specialized knowledge that goes along with it). On the other hand, the rendering speed is impressive: the example scene illustrated here was rendered in 40 seconds, using full 1080p resolution.



3D model courtesy Autodesk

### How it works

### Productivity

This demo-scene for Quicksilver was rendered in 40 seconds in 1080p resolution, which means that a complex walkthrough could be rendered in a few hours on a single workstation, without the need for a high-octane render farm.

### The Feature

**Bottom Line: Quicksilver holds a lot of potential.**

## ▶ Methodology

This benchmark project was commissioned by Autodesk and independently executed by Pfeiffer Consulting.

All the productivity measures presented in this document are based on **real-world workflow examples designed and executed by professionals.**

**No scripting or programming of any kind was used** during the execution of the benchmarks.

For an in-depth description of the benchmark methodology, complete list of benchmarks and detailed results, please download the complete **Autodesk 3ds Max 2011 Productivity Benchmark Report** at [www.pfeifferreport.com](http://www.pfeifferreport.com)

## About the Autodesk 3ds Max 2011 Productivity Benchmarks

The productivity figures in this report are part of an extensive productivity benchmarking project commissioned by Autodesk, in order to independently assess the productivity gains that the latest release of Autodesk 3ds Max can provide 3D professionals.

Pfeiffer Consulting independently developed and executed the benchmarks presented here, by analyzing workflows in 3D production. The benchmarks were designed and executed by experienced 3D professionals.

## How we design the benchmarks

The basic approach is simple: in order to assess productivity gains that a new release or a different product may (or may not) bring, we start by analyzing the minimum number of steps necessary to achieve a given result in each of the applications that have to be compared.

Once this list of actions has been clearly established, we start to execute the operation or workflow in each program, with the help of seasoned professionals who have long-standing experience in the field and with the programs that are tested.

In order to be certain that no lag or operator-induced delays are included in the productivity measures, each benchmarked example is cut down into small segments of three or four steps each. After an initial training phase, each segment is executed three times, and the average time is used as a result. The cumulative times for all segments that form a complete workflow example are then used as benchmark results.

## How we prepare hardware for testing

We use factory-standard configuration hardware, that has been completely re-initialized prior to benchmarking. Only the system software and application software necessary for tests, as well as all required updates at the time of testing, are installed on the benchmark system. No peripherals other than the ones required for the benchmarks are connected. Network access is only enabled when required by the benchmark protocol, or for software activation.

## Hardware

Benchmarks were conducted on two identical Dell™ Precision™ T7400 workstations equipped with 2.83GHz quad-core Intel® Xeon® processors and with 4 to 32 GB of RAM, factory-configured respectively for 32-bit and 64-bit Windows® operating systems.

## About Pfeiffer Consulting

Pfeiffer Consulting is an independent technology research institute and benchmarking operation focused on the needs of publishing, digital content production, and new media professionals. Download the full Autodesk 3ds Max 2011 Productivity Benchmark Report, as well as other benchmark reports and research studies at [www.pfeifferreport.com](http://www.pfeifferreport.com).

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## How We Measure Productivity