

# Macromedia Director\* 8.5 Shockwave\* Studio with Intel® Internet 3D Graphics Software

Powerful, Scalable 3D for the Web Mainstream

Finally—an easy way to deliver scalable, bandwidth-friendly interactive 3D Web content to an audience of millions. With Intel® Internet 3D Graphics Software incorporated into Macromedia's Director 8.5 Shockwave Studio, you can make online games, shopping, entertainment and other content more compelling than ever. And it's not just for niche markets any more. With this breakthrough, 3D on the Web is positioned to become the industry norm.



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Three-dimensional graphics enhance the interactivity and quality of online games and entertainment, and make experiences such as shopping and online learning more impactful, enjoyable and practical. Until now, however, 3D on the Web has been limited to niche markets, primarily because of a fragmented market environment. With the latest version of Director\* 8.5 Shockwave\* Studio, Macromedia and Intel are providing a breakthrough solution that is expected to bring 3D graphics squarely into the Web mainstream and make it easier for developers to reach a broad audience with 3D content.

Director 8.5 Shockwave Studio from Macromedia incorporates Intel® Internet 3D Graphics Software, an adaptive geometry and rendering engine developed at Intel Architecture Labs. These algorithms enable 3D content to scale to the client's machine, thus allowing the 3D experience to be automatically tailored to each user's system. The software also enables content providers to create high performance and interactive yet bandwidth-friendly photorealistic images, cartoon rendering, particle effects and animations on the Web.

With a ubiquitous playback technology for 3D on the Web content (Macromedia Shockwave Player), Web developers will have a variety of opportunities to bring the heightened impact and interactivity of 3D graphics to their sites, and developers of 3D content for CD-ROM will find that the Web now offers an exciting new channel for advertising, marketing and even delivering their products. Users will quickly come to expect leading Web sites to offer interactive 3D graphics capabilities.

### Removing Roadblocks to 3D on the Web

Well executed, interactive 3D content can make nearly any Web site more compelling and effective:

- 3D text, logos, cartoons and graphic elements can better attract, engage and inform Web visitors, increasing a site's "stickiness" and making it easier to communicate critical information.
- Online retail sites can increase sales and reduce returns by using 3D technologies. For example, clothing retailers can give shoppers a realistic idea of how an item of clothing will look on their particular body type. E-furniture stores can let their customers view a couch from many angles. Other retailers might provide interactive 3D models of lawn mowers or radios for their customers to try out virtually. And, instead of just looking at a photo of a sports car, shoppers or game players can virtually get in the car, sit behind the wheel and go head-to-head on the

autobahn with hundreds of other online users.

- E-learning sites can provide a more interactive experience that increases the likelihood that the student will understand and remember the information.
- 3D on the Web also offers new opportunities for traditional game vendors, who can create browser-based versions of their existing games, develop new games exclusively for the Web, and show 3D trailers or demos on the Web. 3D technologies can make online entertainment more fun and heighten the sense of realism.

The market is ready for 3D. More than 50 percent of home PCs run at 333 MHz or higher<sup>1</sup>, and a large portion of home PCs have 3D hardware acceleration and the needed memory. The 56K modem has become the de facto minimum standard, and the number of homes with broadband access will nearly quadruple between 1999 and 2003 according to Jupiter Communications.<sup>2</sup>

<sup>1</sup> Dataquest, "PC Forecasts by Microprocessor Speed", 1998-2002.

<sup>2</sup> Jupiter Analysis, "US Online Households by Access Speed," 1998-2003

So why hasn't 3D on the Web taken off? A primary reason has been the lack of a widely used development environment and player for 3D graphics on the Web. This has meant that developers lacked a clear path to a broad audience. Instead, they had to choose among various niche solutions, modifying and customizing their applications for each player they wanted to support. Compounding the problem, the wide range of client systems has forced developers to either write to the lowest common denominator (thus limiting the quality of the content they produce) or else write different versions of their code for users with differing levels of computing power.

## Intel and Macromedia Team Up

As a building block supplier for the Internet economy, Intel is strongly committed to empowering Web developers and enhancing each user's Internet experience. Researchers at Intel Architecture Labs developed a solution for 3D on the Web content authoring and delivery. They teamed up with Macromedia, provider of the world's most widely used player—Shockwave Player—for multimedia Web content and the robust Director authoring environment, to deliver it to a very broad audience. The results of this teamwork are incorporated into Macromedia Director 8.5 Shockwave Studio and Shockwave Player.

Clearly, any solution for 3D on the Web graphics would have to deliver excellent performance over today's transmission channels. Ideally, it should provide scalability with respect to bandwidth: it should

run well over a 56k modem, and even better over a broadband connection.

An ideal solution would also provide scalability with respect to CPU performance: it would automatically adjust (or scale) the performance and resolution of the 3D experience to match the available client processing power. Scalable technologies offer "author once" simplicity that eliminates the need for developers to create multiple versions of content and frees them to innovate on the highest performance PCs. This scalability enables developers to shorten time to market and save on development costs. At the same time, it increases the user's enjoyment by tailoring the 3D experience to the performance level of his or her PC.

## Intel® Internet 3D Graphics Technology Elements

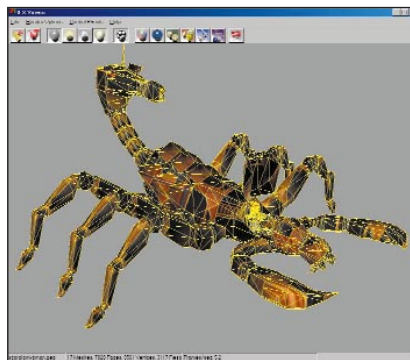
The Intel Internet 3D Graphics Software provides a tool kit for developing scalable, bandwidth-friendly 3D graphics. The graphics algorithms utilize Adaptive 3D Geometry to deliver highly

scalable 3D content that provides an outstanding experience on performance PCs while still running well on basic systems. It enables the delivery of 3D content with multiple resolutions, and offers the best possible experience by automatically increasing or decreasing 3D quality based on the computing power of the system. Intel has enhanced these capabilities for the Web environment, embedded them in a powerful rendering engine, utilized sophisticated streaming techniques to make the most of available bandwidth, and worked with Macromedia to integrate them into Director 8.5 Shockwave Studio and Shockwave Player.

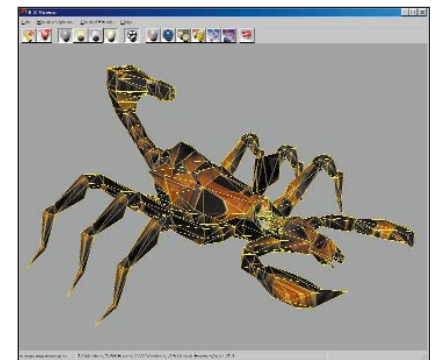
### Multi-Resolution Mesh (MRM)

The more detailed the mesh that represents an object, the more finely detailed is the rendered image. High resolution models are more visually appealing, but they produce larger files (which take longer to transmit to a client PC) and require more processing power to render.

**A Scorpion Model with a High Polygon Count (7020 faces)**



**Same Scorpion Model with a Lower Polygon Count (1758 faces) using Multires 2 RT**

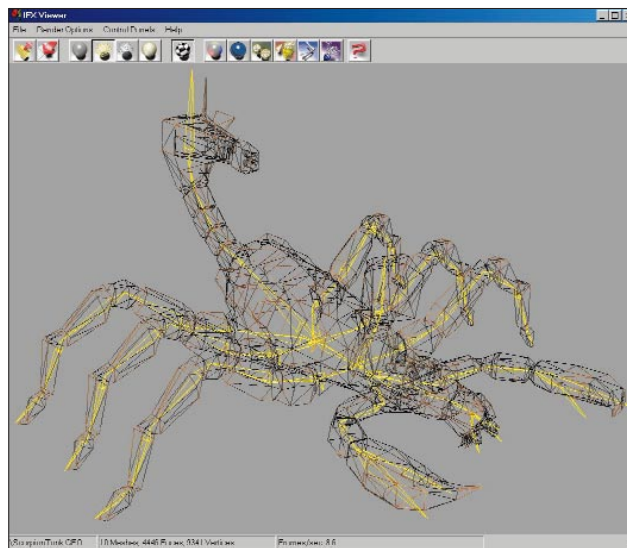


*Multi-resolution mesh allows developers to scale performance to the user's PC.*

To compensate, developers often create a high resolution model for close ups or places where visual detail is important, and a low resolution version for views that are farther from the “camera” or where visual detail is less necessary. The downside to this approach is the extra work involved to create multiple models and, often, a perceptible “snap” when moving between the high and low resolution models. Not only do developers have to create, maintain and store multiple versions of the model, but multiple versions must be transmitted to the user’s PC.

MRM provides an alternative approach: the developer creates a single high resolution model, plus parameters that allow vertices of the model to be removed as needed. The number of polygons can be adaptively changed at run time depending on parameters such as the available CPU power, the distance from the camera viewpoint, and the targeted frame rate. In addition, MRM enables progressive downloads when run in reverse. The model is initially downloaded at its

lowest resolution, and the resolution is progressively increased as additional data for the model pours in over time. This means that objects can look smoother, more lush and realistic, and can scale depending on the available bandwidth and the processing capability of the client.



*Bones animation improves transmission time, reduces development time and enhances viewing quality.*

### *Subdivision Surfaces (Subdiv)*

Subdivision surfaces can be thought of as the inverse of MRM. The developer creates a low resolution model, and the client adaptively enhances it by adding detail triangles. Subdivision surfaces smooth out the mesh, and work especially well for curved surfaces and terrains. This technique minimizes the file size that is transported across the Internet, yet provides high quality models

to the client for rendering. The quality is easily controlled by the content developer to scale with the processing power available on the client.

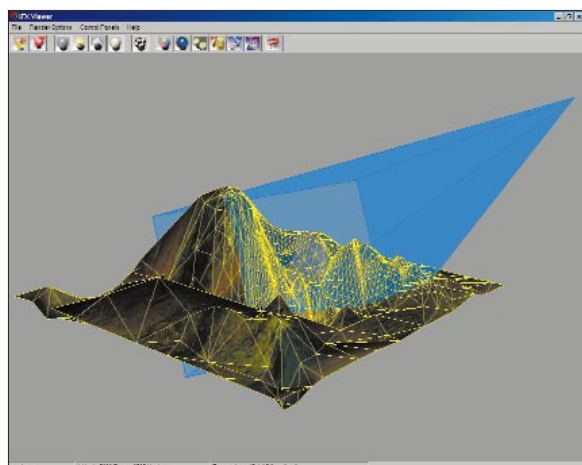
### *Bones Animation*

It’s highly bandwidth intensive to send a fully detailed model for each frame in a traditional 3D character animation. Bones

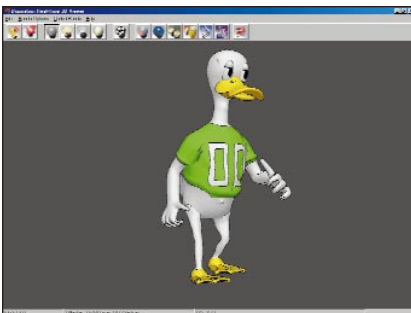
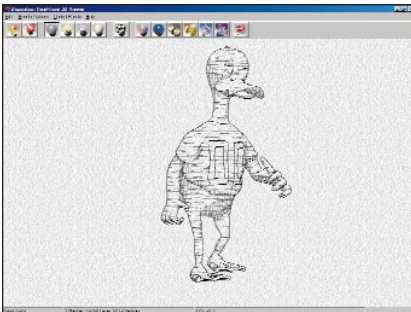
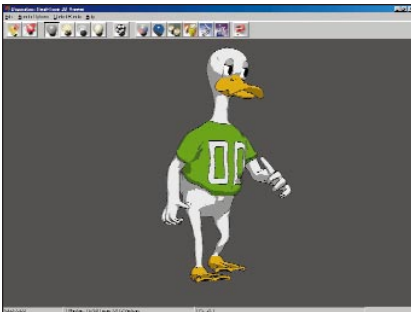
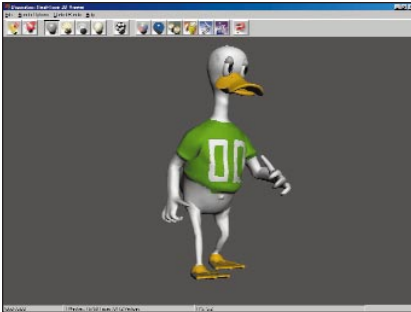
animation enables developers to put “bones” inside a character and create real-time character animation by transmitting just the “bones” data points (instead of all the data points for the entire model), the movements associated with the “bones,” and the instructions for reconstructing the model. Adaptive algorithms provide realistic deformation effects when the skeleton is animated. This feature improves transmission time, reduces development time and enhances viewing quality. For relatively complex models, bones animation also makes it possible to transmit the same animation content with a fraction of the amount of bandwidth previously needed.

### *Non-Photorealistic Rendering (NPR)*

With NPR, developers can render 3D models or scenes into comic book drawings, pencil sketches, watercolor paintings, or other drawing styles. This



*Subdivision surfaces minimize file sizes and improve the viewer’s experience.*



*Non-photorealistic rendering makes it easy to render a 3D model such as a cartoon drawing, pencil sketch or other drawing style.*

feature simplifies development, enables developers to get the most out of their 3D models, and adds variety to 3D content. Instead of having to draw every frame of an animation, the developer can capture the 3D model, use bones to animate it and render every frame.

### *Particle System Effects*

Particle systems make it easy to create realistic effects that can simulate such behaviors as smoke, fire, water, dust, sparks, vapor and explosions. The “particles” can range from points and lines to complex 3D models in themselves, and the number of particles in an effect can vary from a few to several thousand. The particles can be controlled to follow a given direction, can be assigned colors, and can be set to simulate behavior under gravity or wind.

The particle effects are scalable. A content developer can author a greater number of highly detailed particles on performance PCs and a smaller number of lower resolution particles on slower systems. On Intel® Pentium® III and Pentium® 4 processor-based PCs, the particle rendering may take advantage of these systems’ special floating point processing capabilities.

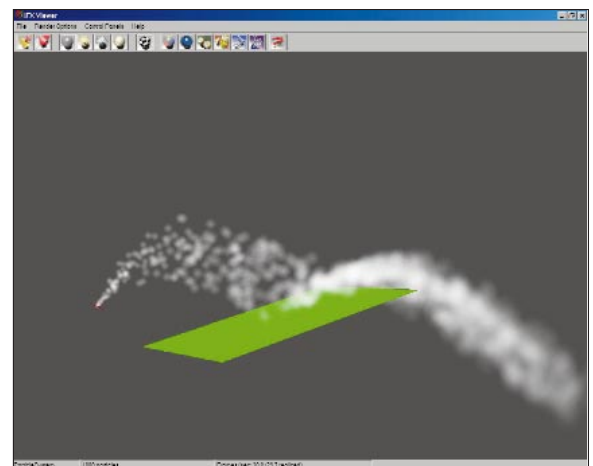
### *Advanced Streaming, Compression and Rendering*

These capabilities are wrapped into a high performance rendering engine with sophisticated compression

and streaming algorithms to produce maximum 3D performance and minimum transmission times.

## **A Comprehensive, Robust Solution**

With Intel Internet 3D Graphics Software integrated into Macromedia Director 8.5 Shockwave Studio, developers have a robust solution for authoring scalable 3D content for the Web and delivering it to an enormous audience of end users via Shockwave Player. Director is Macromedia’s application for developing magnetic Internet destinations and powerful multimedia. Shockwave Player, which is distributed free, is already installed in more than 200 million PCs and Macintosh\* computers, and 250,000 installations are performed each day. When encountering Shockwave 3D content, users will be given the option to automatically update their Shockwave Player. Shockwave Player is also preinstalled on all new Windows\* 98, Windows 2000 and Macintosh\* machines.



*Particle systems make it easy to create realistic effects that can simulate such behaviors as smoke, fire, water, and dust, and optimize their display for the user’s PC.*

## Intel® Internet 3D Graphics Software at a Glance

Capability	Function	Benefits
Multi-Resolution Mesh	Easily create content at a high resolution, which can be scaled up or down depending on the user's PC capabilities and the object's position relative to the camera.	<ul style="list-style-type: none"> <li>▪ Scales performance to user's PC</li> <li>▪ Enables progressive download of models</li> <li>▪ Optimizes each user's 3D experience</li> <li>▪ Simplifies development and time to market with "author once" capability</li> </ul>
Subdivision Surfaces	Automatically create scalable 3D models with photorealistic surfaces from less detailed models.	<ul style="list-style-type: none"> <li>▪ Scales performance to user's PC</li> <li>▪ Optimizes each user's 3D experience</li> <li>▪ Minimizes file size</li> <li>▪ Simplifies development and time to market with "author once" capability</li> <li>▪ Enables high resolution terrains and detailed curved surfaces</li> </ul>
Bones (Skeletal Animation)	Create real-time character animation by using a static 3D mesh with parameters.	<ul style="list-style-type: none"> <li>▪ Optimizes each user's experience</li> <li>▪ Minimizes file size</li> <li>▪ Simplifies development and time to market</li> <li>▪ Provides joint motion capability to models</li> </ul>
Non-Photorealistic Rendering (cartoon rendering)	Transform 3D models into 2D-looking cartoon images, pencil sketches, etc.	<ul style="list-style-type: none"> <li>▪ Simplifies development and time to market with "author once" capability</li> <li>▪ Differentiates 3D content with a unique look</li> <li>▪ Offers real-time rendering of cartoon animations</li> </ul>
Particle System Effects	Quickly create complex animated effects such as rain, smoke, running water or explosions.	<ul style="list-style-type: none"> <li>▪ Optimizes each user's 3D experience</li> <li>▪ Simplifies development and time to market</li> </ul>

Director combines graphics, sound, animation, text, and video to create streaming, multiuser, interactive Web content that is easy to deploy for CD-ROM, DVD-ROM, and the Web. In addition to its 3D enhancements, Macromedia Director 8.5 Shockwave Studio streamlines the authoring process with centralized, automated functions that

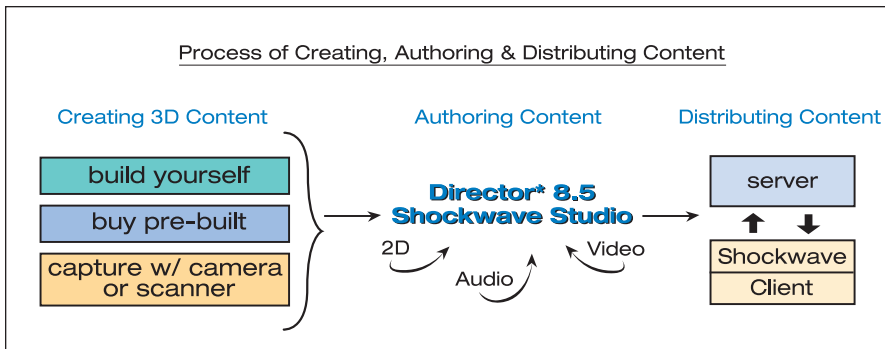
make it easier to manage assets, edit complex animations, build graphics on the fly, and create dynamic content for low-bandwidth delivery.

Lingo\*, Director's object-oriented language, provides over 800 commands to control 3D interactivity, imaging, sound, vector shapes, scaling, rotation, alpha channels, Internet connectivity and

much more. Lingo's dot syntax is comfortable for programmers who are familiar with languages such as JavaScript\* or Visual Basic\*, and the language scales to support large projects like text-intensive Web sites and tutorials. Behaviors are another way to go—these behaviors provide the building blocks necessary for the fast and easy design of custom, interactive interfaces. They are the "short cut for Lingo." Through Xtras\* ([www.macromedia.com/software/xtras](http://www.macromedia.com/software/xtras)), Director provides developers with the ability to create new plug-in modules to provide additional functionality. A powerful linked media feature gives developers the flexibility to create a Shockwave movie shell that can bring in a given piece of Shockwave 3D content at runtime and apply certain functionality to it—such as basic inspect-and-examine options.

Many Macromedia applications support the Macromedia Open Architecture, which provides a rich multimedia platform for both Macromedia and third parties to extend application functionality. Hundreds of thousands of copies of Director have been sold, and because of this huge community of developers and the open architecture, there's an enormous library of Xtras that can be used to add functionality.

Macromedia Director 8.5 Shockwave Studio provides developers with a straightforward, economical business model. There are no licensing fees for Shockwave Player, and no complicated fee structures and royalty payments for content authored using Director. You simply purchase the authoring package and then can develop as much content as



you want. Director also ships with Shockwave Multiuser Server 3 which supports 2,000 simultaneous users. This greatly simplifies the development of massively multiuser online applications, where thousands of users can interact with one another in immersive 3D Web environments. And because Shockwave Player is free, developers are free to distribute it with CD-ROMs, DVD-ROMs or on intranet sites.

The Macromedia and Intel solution for 3D is supported throughout the industry. Leading providers of 3D software tools and content services such as Alias\*/Wavefront\*,

Discreet\*, NxView\* and Softimage\* have announced their intention to use the 3D-enhanced Shockwave Player as a primary delivery platform for the Web. This means that developers can continue to use their favorite tools and systems to create 3D content, bring it into Director to author streaming, multiuser, interactive Web content, and distribute the results via Shockwave Player. Macromedia Director 8.5 Shockwave Studio streamlines the authoring process with centralized, automated functions that make it easier to manage assets, edit complex animations,

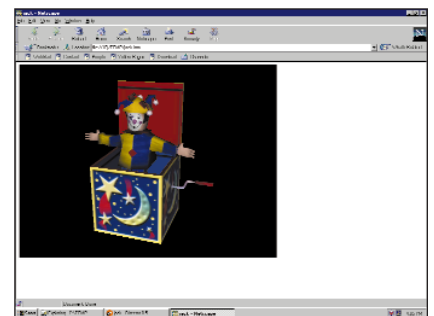
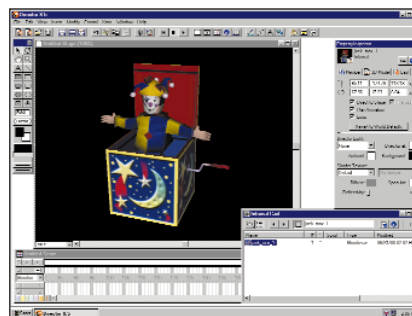
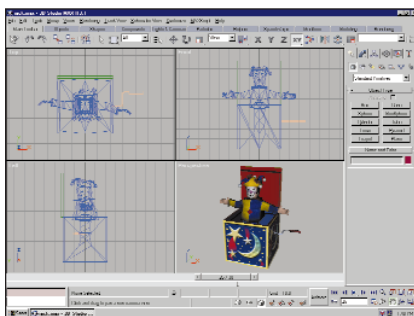
build graphics on the fly, and create content for low- bandwidth delivery.

Developers can choose from three main approaches to creating 3D models:

- Build it yourself, using content development packages that are available at costs ranging from \$100 to \$10,000, depending on the capabilities you require.
- License prebuilt models or portions of models.
- Use a 3D camera and/or scanner to capture a model.

### From a Trickle to a Flood

With the inclusion of adaptive 3D graphics capability for the Web, Macromedia and Intel bring high performance, professional-quality 3D into the Web mainstream. The trickle of 3D on the Web usage today will likely grow to flood-stage as Web sites take advantage of the



*Illustration of the same 3D model in modeling package, Director\*, and Web browser. With broad industry support, Director 8.5 Shockwave Studio provides a comprehensive, end-to-end solution for compelling 3D Web content. Three-dimensional graphics can be created in an object modeling package (left), obtained from prebuilt models, or captured using a 3D camera or scanner. Developers can then import them into Director 8.5 Shockwave Studio to add interactivity and combine them with other elements such as sound, animation, text and video (center). The results can then be displayed in the user's browser (right) using either hardware or software rendering, to enhance online shopping, e-learning and other online activities.*

immediacy, interactivity and ease of development offered by Director 8.5 Shockwave Studio. With the growth of 3D on the Web, tools and content developers are expected to fill the need for prebuilt 3D models.

As 3D on the Web becomes more pervasive, Web developers will have a variety of opportunities to bring the heightened impact and interactivity of 3D

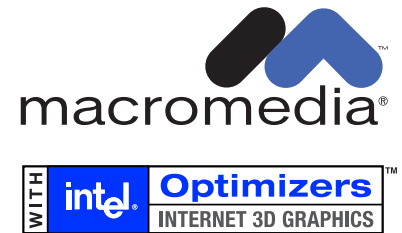
graphics to their sites — and users will quickly come to expect such capabilities. Fortunately, with Macromedia Director 8.5 Shockwave Studio, developers will find it easier than ever to meet the rising demand for interactive 3D Web content. At the same time, developers of 3D content for CD-ROM and Digital Video Interactive (DVI) applications will find that

the Web now offers an exciting new channel for advertising, marketing and showcasing their products.

Act now to take advantage of Shockwave 3D. Visit <http://www.macromedia.com/director> to learn more about developing and distributing Shockwave 3D content and to purchase Director 8.5 Shockwave Studio.

## About Macromedia

Macromedia is passionate about what the Web can be. Macromedia delivers award-winning products and solutions for creating engaging and effective next-generation Web sites. Professional Web developers turn to Macromedia to speed their Web site deployment and create rich, engaging, and personalized Web experiences. Developers and designers use and integrate Macromedia Director Shockwave Studio, Dreamweaver, Dreamweaver UltraDev, Fireworks, Flash, FreeHand, Generator, and Shockwave to build high-impact, automated, interactive sites that deliver motion, sound, graphics, and rich media. Enterprises capitalize upon Macromedia Web solutions, based on the Dreamweaver platform, to strategically manage increasingly complex Web applications, analyze results and, most importantly, generate measurable returns on investment. And the Macromedia Flash and Shockwave Players display the power of the Web to hundreds of millions of consumers, by desktop, laptop, and even hand-held wireless devices.



## About Intel Corporation

Intel Corporation supplies the computing, networking, and communications industry with chips, boards, systems, software, and services that are the “building blocks” of the Internet economy. These products are used to create PC’s, workstations, mobile computers, cellular phones, and Internet access devices, as well as a full range of computing and communications servers and networking hardware. Intel brings its advanced research and development capability, along with volume technology expertise, to the manufacture of these building blocks, and as a result, has been able to radically improve the computing and communication capabilities readily available to individuals and organizations around the world. Intel works with a very broad range of leading computer and peripheral manufacturers, telecommunication providers, software developers, resellers, retailers, solution providers, and integrators worldwide to enable complete solutions based on its products to be delivered to end customers, and to promote industry standards. For more information about Intel Corporation, go to <http://www.intel.com>.



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