Silicon Graphics® Octane2™ Visual Workstation with Advanced VPro™ Graphics

The Silicon Graphics Octane2 visual workstation delivers the world's most advanced desktop visualization. Octane2 combines the groundbreaking VPro 3D graphics system, the industry-leading crossbar architecture, and the high-performance MIPS® processor in an affordable power desktop package.

Octane2 is designed to support a suite of industry-leading options such as the Dual Head and Dual Channel Display options that maximize your visualization resources, the new cost-effective PowerDuo configuration that allows two users to share the same high-performance system, and the DMediaPro™ video options for the most powerful and complete high-definition solution on the desktop.

You can tackle the world's most challenging desktop computing problems with Octane2 and its unprecedented accuracy, interactivity, and performance.

Features	Benefits
Advanced VPro Graphics	
Outstanding scalable graphics performance with VPro™ V10 or V12 graphics	Extremely fast geometry and fill-rate performance for high-speed drawing, even with very complex designs, and high-speed image generation even with fully textured designs
Advanced texture management with up to 104MB of texture memory	Interactive rendering of volumetric data sets; high-performance processing of large textures
OpenGL on a Chip™	Hardware acceleration of OpenGL® core features, including 3D textures for volume rendering and imaging extensions
Hardware-accelerated specular shading (Phong effects)	Improved realism and accuracy for lighting of 3D models
48-bit (12-bit-per-component) RGBA with 16-bit Z buffer capability	Cinematic quality and highest precision for 2D/3D imaging
Support for high resolutions, including HDTV; full-screen stereo support and stereo in a window	Capacity to display large data sets at high resolutions; stereo viewing options
96-bit hardware-accelerated accumulation buffer	High performance and accuracy with depth of field, full-scene anti-aliasing, motion blurs, and other effects
High-speed, user-configurable graphics memory	Flexibility to make optimal use of color resolution, off-screen graphics memory, and screen resolution
High-definition and standard-definition video formats, including 4:4:4 RGB and real-time graphics-to-video output with the DMediaPro video options	High-quality, uncompressed, multi-resolution, and multiformat real-time video input and output for broadcast, post-production, and film
Industry-leading options for innovative visualization and cost-effective use of system resources	Versatile display options with Dual Head and Dual Channel Display capabilities; PowerDuo lets two users share the same high-performance system
Optimized System Architecture	
Single/dual, 600/550 MHz R14000A™ processors, 2MB Level 2 cache	Processing power, speed, and throughput with symmetric multiprocessing (SMP) architecture
Crossbar architecture for high-speed multipoint I/O interconnect	Dynamically and directly links any two computer subsystems; error-checked operations
8GB SDRAM memory capacity; fully addressable with the 64-bit system and OS	Superior interactivity, even with very large data sets
Balanced, scalable design and expandable 64-bit system architecture	Optimum throughput and reliability, cost-effectiveness, long-term investment protection, and ease of upgrading
Proven, Robust IRIX® OS from SGI	
Built on the fifth-generation 64-bit IRIX operating system	Maximizes performance; provides industry-leading real-time response, reliability, serviceability, and binary compatibility with other IRIX products

Industry-Leading Feature Set Designed for Customer Value

The Silicon Graphics Octane2 visual workstation with VPro graphics advances the state of the art on the power desktop.

VPro graphics for Octane2 offer the very best graphics performance available with an unprecedented feature set, including many industry firsts:

- 48-bit (12-bit-per-component) RGBA with 16-bit Z buffer
- 96-bit hardware-accelerated accumulation buffer for depth of field, full-scene anti-aliasing, motion blurs, and other effects
- Hardware-accelerated specular shading (or per-pixel lighting) for Phong effects without a performance penalty
- Advanced texture management with asynchronous texture download capability
- Perspective-correct textures and colors
- High-performance hardware clipping

Octane2 now provides four breakthrough VPro graphics options. The newest graphics subsystems, the next-generation VPro V10 and V12, double the geometry performance of the industry-leading V6 and V8 graphics. VPro graphics are available in two graphics memory configurations on Octane2:

- 32MB (V6 and the high-performance V10)
- 128MB (V8 and the high-performance V12 with its expanded feature set)

Octane2 offers the highest level of visualization:
- *Breakthrough graphics architecture*
- *Optimized high-performance system architecture*
- *Industry-leading options*
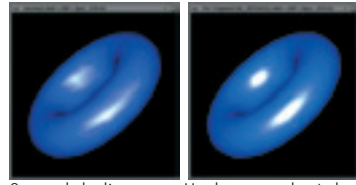
Gouraud shading emphasizes the coarseness of this model's underlying geometry.

Hardware-accelerated specular shading with the same model provides smoother highlights for a more realistic effect.

VPro graphics innovations for Octane2 are designed for the requirements of leading-edge professionals in manufacturing, entertainment, visual simulation, defense imaging, medical imaging, the oil and gas industries, and other fields of science.

Octane2 Delivers Optimal Application Performance for Power Users

For power users in 3D modeling and advanced visualization and imaging, Octane2 optimizes application performance:

- 3D modeling: Octane2 brings a new level of visualization power and functionality to power CAD and power 3D-animation professionals by offering the best graphics performance, new features, and more interactivity with large models. Two users can achieve further cost-benefit and resource efficiencies by sharing one high-performance system with the PowerDuo configuration.
- Advanced visualization and imaging: Octane2 provides industry-leading visual precision and data management for professionals in CAD styling and digital prototyping, the geosciences, entertainment, and the medical and advanced simulation fields. The visual precision and system performance of Octane2 drive enhanced realism and interactivity with fully assembled models. With the high-performance Octane2 V12 system, you can roam through gigabytes of volumetric data. Innovative visualization options such as Dual Head let you drive stereo displays on two monitors or power up to four monodisplays with a single system. The Octane2 V12 system—with its large texture memory capacity, support for 3D textures, and 8GB system memory capacity—is specifically designed for high performance with big data. The deep pixel resolution (12-bit-per-component RGBA) dramatically increases the accuracy of imaging operations. Combined with the industry-leading DMediaPro video options, Octane2 V12 delivers unprecedented video quality, versatility, and performance on the desktop.

MIPS RISC R14000A 600 MHz processor

Choose Octane2 for Performance and Interactivity

Octane2 offers high-performance graphics in a high-bandwidth system for maximum performance

and interactivity. Octane2 with VPro graphics features OpenGL® on a Chip for full hardware acceleration of the OpenGL 1.2 pipeline. The integrated image and texture engine dramatically speeds up texture loading for fast rendering of large, complex models or volumetric data. The asynchronous texture download capability streamlines texture management for even better graphics performance when processing large textures. High-speed, configurable graphics memory allows you to customize and vary the resolution and the size of the frame buffer for the requirements of particular imaging operations.

The unsurpassed crossbar switch design of Octane2 provides excellent levels of interactivity with
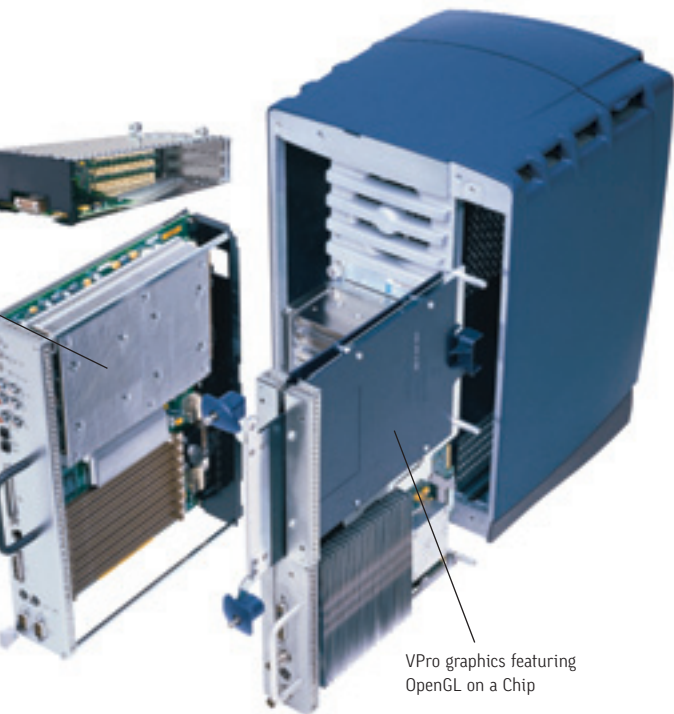
VPro graphics featuring
OpenGL on a Chip

critical data transfers, such as loading a 3D model from memory to the screen or processing high-definition video images in real time. The 1.0GB-per-second peak main memory bandwidth and 1.6GB-per-second peak bandwidth between subsystems ensure that you experience smooth, fluid operations while completing even the most complex tasks. The Octane2 workstation's 8GB memory capacity gives you increased power to handle bigger data sets for more accurate analysis in less time.

Configured with single or dual MIPS processors, Octane2 delivers the power to quickly complete one task or simultaneously tackle multiple tasks such as design and analysis or motion modeling and behavior scripting. The exceptional system responsiveness means that you can perform more tasks on more data than ever before at the desktop level.

Choose Octane2 for Extreme Visual Quality and Accuracy

Octane2 features a 12-bit-per-color component path (48-bit RGBA) for all operations throughout the pixel pipeline. The higher resolution, combined with perspective-correct color and texture, equates to more accurate color, more realistic blending of colors for transparent objects, higher-quality volume visualization using 3D textures, and expanded image-processing capabilities. High resolution is retained through the display interface, where 10-bit-per-component digital-to-analog converters ensure display accuracy.

The Octane2 workstation's hardware-accelerated specular shading also introduces a new level of accuracy to desktop graphics. Specular shading, or per-pixel lighting with normal interpolation, produces highly accurate lighting and highlights to create very realistic shaded surfaces for 3D modeling. Traditional Gouraud lighting can distort color and highlights, especially when coarsely tessellated solids are being rendered. This is the result of calculating the color only at each triangle vertex and then interpolating that color across the triangle. By contrast, specular shading interpolates normals (not colors) and does an interpolation for each pixel. In this way, specular shading provides a more accurate representation of the curvature of surfaces, improving the viewer's ultimate understanding of the model.

Choose Octane2 for Versatility and Interoperability

Octane2 is built on IRIX, the advanced, high-performance 64-bit operating system from SGI, and is complemented by the industry's most comprehensive selection of software tools and applications. Octane2 combines IRIX, digital media capabilities, and a full complement of interoperability, connectivity, and system administration tools. This allows broad application utilization and convenient integration into heterogeneous environments. This versatility and interoperability translate directly into time and cost savings.

Choose Octane2 for Long-Term Value

When you purchase an Octane2 system, your investment becomes a long-term asset. Scalable components let you easily upgrade your system as your computational and application requirements grow. For example, you can easily upgrade to higher processors, more memory, and new graphics.

An evolution of proven technology, Octane2 offers the stability and reliability required in demanding real-world applications. Octane2 is designed with future product enhancements in mind, ensuring that you can take advantage of ongoing visualization and performance advancements from SGI.

System Features

Processor Support
- 1–2 MIPS RISC 64-bit R14000A
- 2MB L2 cache

Memory Capacity
- 256MB–8GB synchronous DRAM (SDRAM)

Internal Storage
- 18GB, 36GB, or 73GB 10,000 RPM fast/wide Ultra SCSI drive

Graphics Subsystem
- Full hardware acceleration of OpenGL 1.2, GLX™ 1.3, OpenGL ARB imaging extensions

Graphics Memory
- VPro V6: 32MB graphics memory, including up to 8MB texture memory
- VPro V10: 32MB graphics memory, including up to 8MB texture memory
- VPro V8: 128MB graphics memory, including up to 104MB texture memory
- VPro V12: 128MB graphics memory, including up to 104MB texture memory

Graphics Architecture
- Integrated vertex processing engine
- Integrated image and texture engine
- 12-bit-per-component color and alpha, double-buffered
- 24-bit eye space Z buffer and 8-bit stencil buffers
- 10-bit digital-to-analog (DAC) display interface
- Multiple concurrent visuals (8-bit window ID)

Hardware Lighting and Shading
- Flat shading, Gouraud shading
- Specular shading with normal interpolation for accurate lighting and specular highlights
- Separate specular color (post-texture lighting)

Hardware Texturing
- 3D textures, texture color tables, texture coordinate clamp, texture LOD bias, texture scale bias, detail texture, pixel texture

Effects
- Convolution, histogram, color matrix, color table
- Hardware-accumulation buffer (Octane2 V8, V12)
- Quad-buffered stereo support
- Perspective-correct texture and color
- Per-pixel fog, fog function, fog offset
- Line anti-aliasing
- Hardware-assisted full-scene anti-aliasing
- Blend color, blend logic op, blend minmax, blend subtract

Visual Formats
- 32-bit RGBA (8,8,8,8) double-buffered, 24-bit Z buffer, 8-bit stencil
- 32-bit RGBA (10,10,10,2) double-buffered, 24-bit Z buffer, 8-bit stencil
- 48-bit RGBA (12,12,12,12) (Octane2 V6, V10, V8, V12); double-buffered (Octane2 V8, V12); 16-bit Z buffer (Octane2 V12 only)
- 16-bit RGBA quad-buffered (stereo), 24-bit Z buffer, 8-bit stencil
- 12-bit Colorindex, double-buffered, 24-bit Z buffer, 8-bit stencil
- 12-bit Colorindex, quad-buffered (stereo), 24-bit Z buffer, 8-bit stencil
- 8-bit overlay and 8-bit window ID
- 96-bit (24,24,24,24) hardware-accumulation buffer (Octane2 V8, V12)

Display Resolutions
- From 640x480 at 60 Hz
- Up to 1920x1200 pixels at 60 Hz and 72 Hz

For the full list of supported resolutions for each graphics option, see *www.sgi.com/go/resolution.*

I/O
- Crossbar: 1.6GB/sec/port (6 ports, 4 available for XIO™ systems like graphics and end-user options)
- Internal single-ended SCSI controller
- External single-ended SCSI controller
- 4 XIO board slots (Octane2 V6, V8, V10, or V12 graphics require 2 of the 4 slots)
- Single half-height, dual full-height PCI slots with optional PCI cardcage

Communication
- Single 10Base-T/100Base-TX port
- Dual serial RS422/RS423 DB-9 ports
- Single bidirectional parallel port
- 6 audio I/O ports

Display Options

Monitors
- 21" color monitor
- 24" color monitor
- 18" Silicon Graphics® flat panel display
- 22" Silicon Graphics® flat panel display

Graphics
- Dual Head option (two V10 or two V12 graphics boards); available in a PowerDuo configuration to support two users on the same system
- Dual Channel Display option (Octane2 V12); 80MB texture memory available when using this option; can be combined with V12 Dual Head option to drive up to four displays

Digital Media

Features
Analog Audio
- Mono-microphone, self-powered stereo
- Desktop loudspeakers with headphone output, stereo analog—10 dBV line level (18-bit A to D and D to A)

Options
Digital Audio
- 24-bit AES-3id I/O (2 channels)
- 24-bit ADAT optical I/O (8 channels)

DMediaPro™ DM2 High-Definition and Standard-Definition Video I/O
- SMPTE 259M and 292M SDI inputs and outputs for video and alpha
- SD video formats: 480i (NTSC), 576i (PAL)
- HD video formats: 720p, 1080i, 1080p

DMediaPro™ DM5 High-Definition and Standard-Definition Graphics-to-Video Output
- Compatible with DM3 and DM6 and supports respective file formats

DMediaPro™ DM6 Standard-Definition Digital I/O
- SMPTE 259M SDI video I/O
- PAL and NTSC support

Expansion Options

XIO
- Quad-port Ultra SCSI (differential)
- Quad-port 100Base-TX and 6 460Kb/sec serial ports
- Dual-port 1GB Fibre Channel
- Single-port 2GB Fibre Channel

PCI (Requires PCI Expansion Unit)
- PCI digital audio
- Single-port 1000Base-T
- Single-port 100Base-TX
- Single-port differential Ultra SCSI
- Single-port single-ended Ultra SCSI
- Dual-port Ultra160 SCSI LVD
- Single-port 2GB Fibre Channel
- Dual-port 2GB Fibre Channel
- Single-port 1GB Fibre Channel
- ISDN basic rate interface

Storage Options

Internal
- 3 internal 3.5" storage bays

External
- 3.5" 120MB superdisk floppy drive
- 20GB 4 mm DAT drive
- 12X DVD-ROM[1]
- 40X CD-ROM
- DVD RAM[2]

- SGI® Total Performance 900 (TP900), SGI® Total Performance 9100 (TP9100), SGI® Total Performance 9300 (TP9300), SGI® Total Performance 9400 (TP9400), SGI® Total Performance 9500 (TP9500) storage systems, SGI® NAS and SAN solutions

Software

System
- IRIX 6.5 Advanced Workstation Environment supports UNIX® 95, MIPS®ABI, Year 2000
- REACT™ real-time extensions

Graphics APIs
- OpenGL, OpenGL Performer™, OpenGL Volumizer™, OpenGL Shader™, OpenGL Multipipe™ SDK, OpenML® and Digital Media Software Development Kit (dmSDK)

System and Network Management
- SGIconsole™, Embedded Support Partner (ESP), FailSafe™ high-availability solution, Performance Co-Pilot™, Platform Computing Load Sharing Facility (LSF) Suite, TCP/IP, NFS V2/V3, RSVP, DHCP, Bulk Data Service (BDSpro), SNMP, network load balancing software

Filesystem and Data Management
- XFS® 64-bit journaled filesystem with guaranteed rate I/O, CXFS™ shared filesystem for SANs, Network File System, Samba®

Desktop Environments
- IRIX Interactive Environment with Personal System Administration for ease of use without system administrator assistance; Common Desktop Environment; GNOME (Freeware); KDE (Freeware)

Development Tools
- MIPSpro™ C, C++, Fortran 787/90 compilers, ProDev™ WorkShop debugger with SGI® SpeedShop™ performance analysis tool, Power Fortran, APO (Automatic Parallelization Option), SCSL scientific and math libraries, and MPT (Message Passing Toolkit) for MPI and SHMEM programming

Interoperability
- NFS V3, Samba (Freeware)

Collaboration Software
- OpenGL Vizserver (client and server) and SGI® Web Server

Utility Software
- InfoSearch for online documentation, RoboInst™ for streamlined software and update installation across a network of SGI systems, Impressario™ printing software

Security
- CAPP certification for IRIX, LSPP with Trusted IRIX™; SGI® IPfilter firewall; strong-encrypted/random number generation; OpenSSL cryptography library; Open SSH secure networking

Digital Media Software
- SoundEditor, MovieMaker, ImageWorks, SoundTrack, FX Builder, MediaPlayer, Audio Panel, Synth Panel, Media Convert

Support Services

Embedded Support Partner (ESP)
- 7x24 system monitoring, flexible real-time notification and proactive system management for increased system availability

SGI Supportfolio™
- Instant Web access to customer support information

SGI Knowledgebase
- Online access to thousands of proven support solutions

Hardware and Software Support
- Mission Critical, SGI® FullExpress™, SGI® FullCare™, HardwareCare, SoftwareCare

Physical Environment

System
- 16.25" H x 11.0" W x 13.25" D
- 14.75" D (depth in localized area of power supply)
- 16.25" D (depth in localized area of optional PCI module)
- 54 lb
- 21" monitor: 17.6" H x 16" W x 16.5" D

Voltage and Frequency
- 100–120/200–240 VAC

Heat Dissipation
- 2,400 BTU/hour
- +13°C to +35°C operating
- -10°C to +65°C nonoperating

Relative Humidity
- 10% to 80% operating, no condensation
- 10% to 95% nonoperating, no condensation

Altitude
- 10,000 ft operating
- 40,000 ft nonoperating

Vibration
- 0.02", 5–19 Hz; 0.35G, 19–500 Hz

Regulatory Agency
- Electromagnetic FCC Class A

Emissions
- Canada DOC Class A
- CISPR22 Class A
- VCCI Class A

[1] Requires IRIX® 6.5.20
[2] Requires IRIX 6.5.21