New IBM IntelliStation A Pro models deliver 64-bit processing power through AMD Opteron processors, and introduce PCI Express graphics and dual-core processors

Overview
Position yourself for the future of 64-bit computing with the IntelliStation® A Pro workstation. This workstation features AMD Opteron processors and PCI Express x16 graphics that enable simultaneous 32- and 64-bit computing for optimum performance. The AMD Opteron processor helps protect your investment in your current 32-bit applications while preparing to migrate to 64-bit applications when you are ready.

Take advantage of the multitasking, multithreaded application power of the latest IntelliStation A Pro models. New technologies, including PCI Express graphics and dual-core processors, contribute to an outstanding system design to help you achieve the next level of creativity and reduce project turnaround times.

These highly scalable systems deliver a price-to-performance ratio that is ideal for petroleum/chemical, life sciences, and other high-performance computing segments. They also offer the freedom to create in the digital content and engineering segments, enabling added realism through more detail, textures or lighting, smooth movement, and reducing compositing and rendering time.

Solid performance
• Choice of AMD Opteron processors
  - Model 250, 252 single-core, or dual-core 275
  - SMP-capable
  - 1 MB L2 cache
• Up to 16 GB of PC3200 CL3 double data rate (DDR) ECC SDRAM RDIMM
• Dual Ultra320 SCSI and SATA HDD subsystems
• Choice of S.M.A.R.T. HDDs
  - 73.4 GB5 Ultra320 SCSI at 10,000 rpm
  - 80 GB SATA at 7,200 rpm
• 530-watt, auto ranging power supply

Compelling graphics
Your choice of dual-head capable PCI Express graphics:
• NVIDIA Quadro NVS 280
• NVIDIA Quadro FX 1400
• NVIDIA Quadro FX 3400
• 3Dlabs Wildcat Realizm 800

Outstanding support
The highly reliable IntelliStation A Pro systems feature a three-year limited warranty on parts and labor. In the United States and Canada, call IBM at 800-IBM-SERV (426-7378). Telephone support may be subject to additional charges.

For the latest information on safe and effective computing, visit http://www.ibm.com/pc/safecomputing

Planned availability date
June 27, 2005

At a glance
The new highly scalable IntelliStation A Pro models deliver price-to-performance ratio with the latest technologies, graphics, and outstanding service and support.
• AMD Opteron processors — single or SMP-capable
  Models 250, 252, or dual-core Model 275
• Up to 16 GB1 of ECC DDR SDRAM RDIMM addressable memory2
• PCI Express x16 graphics:
  - NVIDIA Quadro NVS 280 for performance 3D
  - NVIDIA Quadro FX 1400 for advanced 3D
  - NVIDIA Quadro FX 3400 for high-advanced 3D
  - 3Dlabs Wildcat Realizm 800 for extreme 3D
• HDDs:
  - Integrated Ultra320 and SATA support
  - High-performance 10,000 rpm Ultra320 SCSI or 7,200 rpm SATA HDDs with S.M.A.R.T.
• Choice of optical devices:
  - CD-RW/DVD-ROM combination
  - Multi-burner
• Gigabit Ethernet, IEEE 1394, storage interfaces (U320 SCSI, SATA, IDE), and audio
• Rack-mountable tower system with six slots, six bays, and 530-watt power supply with power factor correction (PFC)
• Microsoft™ Windows™ XP Professional
• Red Hat Enterprise Linux™ WS 3 (AMD64) models 28x, 37x, and 38x
• System hardware limited warranty3 — CRU or on-site4 three years, parts and labor

This announcement is provided for your information only. For additional information, contact your IBM representative, call 800-IBM-4YOU, or visit the IBM home page at: http://www.ibm.com.
Description

The new IntelliStation A Pro systems deliver a leadership combination of technology, advanced industrial design, and IBM quality, service, and support.

General product attributes

- AMD Opteron system that supports internal processing speeds up to 2.6 GHz
- Support for up to two CPUs
- 1 MB on-board L2 cache
- Four DIMM sockets per CPU (eight total) offering address capability for 16 GB of ECC DDR SDRAM RDIMM memory on dual-processor systems
- PCI Express x16 graphics slot on system board that supports the following dual-head-compatible PCI Express adapters:
  - NVIDIA Quadro NVS 280 with 64 MB video memory
  - NVIDIA Quadro FX 1400 with 128 MB of DDR SDRAM
  - NVIDIA Quadro FX 3400 with 256 MB of DDR SDRAM
  - 3Dlabs Wildcat Realizm 800 with 640 MB of DDR SDRAM
- Integrated SATA and dual-channel Ultra320
- Five PCI slots and one PCI Express x16 slot:
  - One PCI-X 64-bit/133 MHz
  - Three PCI-X 64-bit/100 MHz
  - One PCI 64-bit/100 MHz with zero-channel RAID (ZCR) support
- Choice of optical devices:
  - CD-RW/DVD-ROM Combination
  - Multi-burner
- Choice of S.M.A.R.T. HDDs:
  - 73.4 GB Ultra320 SCSI at 10,000 rpm
  - 80 GB SATA at 7,200 rpm
- Integrated Gigabit Ethernet with RJ-45 port
- 530-watt, voltage-sensing power supply with PFC
- Rack-mountable tower with six slots, six bays, and five to six fans
- One PS/2® keyboard port, one PS/2 mouse port, two 9-pin serial ports, one 25-pin parallel port, five USB 2.0 ports, and two IEEE 1394 ports
- AC’97 audio
  - Line in/out jacks and microphone-in on rear
  - Microphone-in and line-out on front
- IBM 104-key keyboard and three-button PS/2 mouse
- Preloaded operating system
- Plug-and-play capability as supported by operating system

Note: For additional information, refer to the Additional product attributes section.

Advanced industrial design

Rack-mountable tower

Expansion bays: Six expansion bays
- Two accessible 5.25-inch half-high bays (one with CD-ROM)
- One accessible 3.5-inch slim bay
- Three internal 3.5-inch slim bays (one with HDD)

Expansion slots: Six expansion card slots
- One PCI Express x16 slot occupied with graphics adapter
- One PCI-X 64-bit/133 MHz
- Three PCI-X 64-bit/100 MHz
- One PCI 64-bit/100 MHz with ZCR support

Fans: Five to six fans
- One fan with power supply
- Three additional system fans (80 x 38 mm)
- One to two CPU fans

For slot availability and card length restrictions, refer to the Limitations section.

System software

All models run Microsoft Windows XP Professional or Red Hat Enterprise Linux WS 3 and are shipped with the following:
- Preload image on the HDD
- CD-ROM that includes selected device drivers for Windows XP and Red Hat Enterprise Linux WS 3

Refer to the Software information section for a full list of software shipped with the IntelliStation A Pro.

Note: Applications and device drivers may vary from the retail version and may not include all functions and documentation. Not all applications are available separately; titles are subject to change. IBM makes no representation or warranties regarding non-IBM products. For non-IBM software, applicable vendor software licenses may apply.

Compatibility, service, and support

- Compatibility:
  - PCI
  - EIDE/SCSI/SATA
  - PCI Express
  - USB
  - Serial and parallel ports

For the latest information on software and hardware compatibility testing and certifications, visit http://www4.pc.ibm.com/pwscompat

- Manufactured to meet IBM high quality standards
- Service and support: Three-year parts and labor, CRU or on-site repair (IOR)
Accessibility by people with disabilities

The following features support use by people with disabilities:

- Controls and latches operable with one hand and minimal dexterity
- Keys are discernible by touch without activating them
- Ports and connectors support connection of industry-standard devices

Product positioning

The latest IntelliStation A Pro workstation with Opteron processors offers 64-bit computing while remaining compatible with the vast x86 software infrastructure. It enables a single architecture across 32- and 64-bit environments — all using industry-standard components. New technologies in the AMD architecture enable simultaneous 32- and 64-bit computing with optimum performance. The AMD Opteron processor lets you protect your investment in your current 32-bit applications, while allowing you to migrate to 64-bit applications. Several AMD architectural design points make this performance possible:

- Integrated memory controller changes the way the processor accesses main memory, resulting in increased bandwidth, reduced memory latencies, and increased processor performance. Available memory bandwidth up to 6.4 GB/s (with PC3200) per processor alleviates performance bottlenecks seen in traditional systems designed with a front-side bus.
- HyperTransport technology provides a scalable bandwidth interconnect between processors, I/O subsystems, and other chipsets with support of up to three HyperTransport links, providing up to 19.2 GB/s peak bandwidth per processor.
- 64-bit wide key data and address paths that incorporate a 48-bit virtual address space and a 40-bit physical address space.

New technologies include:

- AMD Opteron Models 250, 252 single-core, and dual-core Model 275 processors
- x16 PCI Express slot
- Integrated SATA and dual-channel U320 SCSI
- Gigabit Ethernet
- PCI-X (133 MHz and 100 MHz)

The IntelliStation A Pro system provides computational power with an advantageous price-to-performance. It provides a compelling reason for customers to migrate from UNIX®, especially as the key applications are migrated to take advantage of the AMD Opteron 64-bit technology and Linux operating system. With the introduction of dual-core processors, these customers will see improved performance for their multi-threaded applications to further improve overall productivity, when they are ready to do so.

The IntelliStation workstations are part of the IBM® xSeries® server family and benefit from joint development in the areas of technological advances, management, and design. The new IntelliStation design incorporates new technologies that have already been tried and proven in the server arena such as diagnostic LEDs, integrated mirroring, and PCI-X. Joint development helps to enable even higher reliability and dependability of the latest IntelliStation workstations.

Reference information

1. Maximum addressable memory is 16 GB in dual processor systems and 8 GB in single processor systems.
2. Standard memory in all models is PC3200 ECC DDR SDRAM RDIMM.
3. For information on the IBM Statement of Limited Warranty, call 800-IBM-SERV (426-7378) or contact your IBM representative or reseller. Copies are available upon request.
4. You may be asked certain diagnostic questions before a technician is sent.
5. GB equals 1,000,000,000 bytes when referring to HDD capacity; accessible capacity may be less.

Trademarks

IntelliStation, PS/2, and xSeries are registered trademarks of International Business Machines Corporation in the United States or other countries or both.
The e-business logo is a trademark of International Business Machines Corporation in the United States or other countries or both.
Microsoft and Windows are trademarks of Microsoft Corporation.
UNIX is a registered trademark of the Open Company in the United States and other countries.
Linux is a trademark of Linus Torvalds in the United States, other countries or both.
Other company, product, and service names may be trademarks or service marks of others.
Additional product attributes

The IntelliStation® A Pro system includes the following features:

- **System:**
  - Some of the functions typically provided by a Baseboard Management Controller (BMC) chipset are provided by a hardware monitor.
  - Standard system configurations do not include a diskette drive; optional diskette drive can be attached.
  - BIOS supports non-embedded diagnostics.
  - The devices attached to rear 1394A ports can receive power from the system while the devices attached to the front 1394A ports need to be self-powered.

- **Dual-processor system:**
  - The second CPU speed and stepping level must be the same as the system CPU on the planar.
  - The installation of a second CPU node provides additional four memory DIMM slots.

- **System boot:** System can be booted from HDD, a diskette, optical media, or a USB diskette drive. Booting from a 1394A device is not supported.

- **System management:**
  - RAID is supported with the SCSI interface.
  - System wakeup is provided from various interfaces except devices attached by a USB port.

- **Memory:**
  - Subsystem resources are managed using some portions of the installed memory.
  - The system planar has four memory DIMM slots.
  - Second CPU has four additional DIMM slots.
  - Total ROM address space available for on-board devices and optional adapters is consistent with IA32 machines currently available. If a system is configured with too many such devices, some of the option ROMs may have to be disabled on on-board devices.
  - System is supported through memory in matched pairs on planar and second CPU node.
  - IntelliStation A Pro systems are shipped with PC3200 CL3 ECC DDR SDRAM RDIMM memory and also support PC2700 CL2.5 ECC DDR DRAM RDIMM memory.
  - To achieve maximum memory capacities, you may need to replace standard memory with the currently supported memory DIMMs available from IBM that offer the largest capacity.

- **HDDs are subject to bay usage limitations:** refer to the **Limitations** section
  - Maximum of four internally mounted Ultra320 SCSI or two SATA HDDs are supported.
  - Maximum internal HDD capacities assume the replacement of any standard HDDs and the population of all HDD bays with the largest currently supported HDDs available from IBM.
  - The maximum internal HDD capacities can be supported via the following configurations:
    - 12 TB with four 300 GB Ultra320 SCSI HDDs; refer to the **Limitations** section
    - 500 GB with two 250 GB 7,200 rpm SATA HDDs
  - Systems support a USB diskette drive.
  - The SATA HDD controller and Ultra320 controller are standard with the IntelliStation A Pro systems.

- **Graphics:** Systems have one PCI Express slot, which supports only PCI-compliant graphics accelerators. Models of the IntelliStation A Pro 6217 are shipped with NVIDIA Quadro NVS 280, NVIDIA Quadro FX 1400, NVIDIA Quadro FX 3400, or 3Dlabs Wildcat Realizm 800 PCI Express compliant adapters.

- **Operating system:** In addition to supporting Microsoft® Windows® XP Professional and Red Hat Enterprise Linux™ WS 3, other Linux versions are also planned to be tested and certified for the IntelliStation A Pro workstation.
  

- **Power management:** Advanced Configuration and Power Interface (ACPI) support depends on the installed operating system.

- **Miscellaneous:** To use the IntelliStation A Pro system as a rack-mounted system, an IBM Rack Mount Kit (09N4300) is required.

Advanced manageability and security information

**Advanced Power Management (APM):** The IntelliStation A Pro system supports the APM Specification, V1.2.

APM provides a cooperative environment in which applications, operating systems, and device drivers work together to reduce power consumption.

All models have an APM feature called standby. This power management feature places the system in standby mode after a user-defined time interval has elapsed with no activity. The system resumes operation when the keyboard or mouse is used.

This announcement is provided for your information only. For additional information, contact your IBM representative, call 800-IBM-4YOU, or visit the IBM home page at: http://www.ibm.com.
The scheduler feature is used to start events, such as resume or program initiation, when the system is off.

The Wake on LAN® feature allows a remote network administrator or server to communicate with the system even when it is powered off.

The Wake Up on Ring feature allows your computer to receive voice messages and faxes (with optional fax modem supporting Wake Up on Ring) even while it is powered off.

Note: Some software may differ from its retail version, if any, and may not include user manuals or all program functionality. Warranty service and support for non-IBM products are provided directly to you by the vendor, not IBM. IBM makes no representation or warranties regarding non-IBM products. For non-IBM software, applicable vendor software licenses may apply.

**IBM manageability tools**

**Desktop Management Interface (DMI) Service Provider:**
This tool can help administrators manage and control hardware and software products on desktop computers and servers. Each DMI-compliant component registers its configuration information in a management information format file that follows an industry-standard format. The IntelliStation system is DMI specification 2.0-compliant. Support documentation is built into the help system.

- DMI BIOS Instrumentation retrieves information from the system BIOS, such as memory configuration, BIOS version and date, and microprocessor and cache information.
- PC System Monitor Instrumentation monitors system-board temperatures, system voltages, and fan speed, and detects removal of the computer cover. Data is reported to the DMI service layer. Systems management software, such as IBM Director Agent, can then be used to send an alert to the user or the system administrator if a problem occurs.

**IBM Director Agent (Windows models only)**

IBM Director Agent, a client management application for networked computers, centralizes control of your computer systems to help lower the total cost of ownership. View, monitor, and control your networked computers with IBM Director Agent.

With IBM Director Agent you can:

- Learn detailed inventory information about your computers, including the operating system, memory, network cards, and hardware.
- Track your computers proactively with features such as power management, event log, and system monitoring.
- Upwardly integrate with Tivoli® Enterprise, Tivoli NetView®, Computer Associates Unicenter, HP OpenView, Microsoft SMS, BMC Patrol, and NetIQ AppManager.

Because IBM Director Agent uses some of the latest systems management standards, including Common Information Model, Web-Based Enterprise Management, and XML, it is designed to be compatible with the enterprise management software you already have.

IBM Director Agent can also be used with the complete IBM Director product for more comprehensive workgroup management:

- Managing groups of systems
- Performing tasks on those groups
- Responding to alerts with automated action plans

When running 32-bit operating systems, the IntelliStation workstation supports IBM Director. The software versions, features, and functions of IBM Director Agent may change as new releases become available or may be discontinued at any time. To see if your computer is supported, visit http://www-1.ibm.com/servers/eserver/xseries/systems_management/xseries_sm.html

**Technology enablers**

IBM technology enablers are the supporting hardware designed into IBM products to enable comprehensive systems management.

- Preboot eXecution Environment (PXE) is firmware located on the network interface card that allows a networked PC to find a configuration server on the network before loading any operating system.
- S.M.A.R.T. HDDs offer early warning of some failures so that critical data can be protected. S.M.A.R.T. HDDs are the industry-standard reliability indicator for both Ultra SCSI and SATA HDDs.
- Wake on LAN enables administrators to remotely power on a networked client system from a powered-off state.

**Alert Standard Format (ASF):** Enhances your ability to monitor PCs locally or remotely. ASF notifies you immediately of system events such as chassis intrusion, client disconnect from the network, or system startup errors, regardless of the power state of the system. ASF provides both systems management and asset protection. Systems management notifies you of configuration changes during power-on self-test (POST), system errors during POST, and operating system hangs or errors. Asset protection tracks the system presence via monitoring of a LAN connection and tracking intrusion regardless of whether the system is fully powered on, or whether the system is off but still plugged into the outlet. Also, ASF notifies you when environmental conditions, such as the temperature, are abnormal.

**Hardware and software information**

**Hardware information**

**Monitors:** IBM monitors supported by the IntelliStation A Pro workstation will be reflected in the compatibility report to be made available to marketing and support channels when testing is complete.

**Performance 2D graphics**

**NVIDIA Quadro NVS 280 PCI Express video adapter:** This 2D class video adapter is used in high-performance 2D models. This adapter includes:

- NVIDIA NV37LT video chip
- Both low-profile and standard ATX/BTX form factors
- 64 MB of 200 MHz DDR SDRAM
- Dual 350 MHz RAMDACs integrated into the video chip
- Flashable video BIOS
- DDC2B monitor connector
The NVIDIA NV37LT chip is a 100% compatible superset of the VGA function, supports all VGA modes, and contains all of the following advanced features.

**Technical capabilities**

- 64-bit, 200 MHz DDR SDRAM interface
- 350 MHz internal RAMDAC supporting analog resolution up to 2048 x 1536 in single- and dual-monitor mode
- NVIDIA nView display technology allows a single PCI Express adapter to independently support any two of the following displays:
  - Analog CRT monitor
  - Digital CRT monitor (with optional DMS59-to-Dual DVI-I cable)
  - Analog flat panel
  - Digital flat panel (with optional DMS59-to-Dual DVI-I cable)
- x16 PCI Express support
- Flashable video BIOS
- VESA VBE V2.0 and DDC2B compliance
- Display power management signaling (DPMS)
- Complete plug-and-play support

**Display modes:** The NVIDIA Quadro NVS 280 (NV37LT) supports the following screen resolutions and refresh rates:

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Color</th>
<th>Refresh rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>320 x 200</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>320 x 240</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>400 x 300</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>480 x 360</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>512 x 384</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>640 x 400</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>640 x 480</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>800 x 600</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1024 x 768</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1152 x 864</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1280 x 960</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1280 x 1024</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1600 x 900</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100</td>
</tr>
<tr>
<td>1600 x 1200</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1792 x 1344</td>
<td>8, 16, 32</td>
<td>60, 75</td>
</tr>
<tr>
<td>1856 x 1392</td>
<td>8, 16, 32</td>
<td>60, 75</td>
</tr>
<tr>
<td>1920 x 1080</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100</td>
</tr>
<tr>
<td>1920 x 1200</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1920 x 1440</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>2048 x 1536</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75</td>
</tr>
</tbody>
</table>

**Advanced 3D graphics**

**NVIDIA Quadro FX 1400 128 MB PCI Express video adapter**

This adapter includes:

- NVIDIA NV41GL graphics processing unit
- Full support for Shader Model 3.0 / DirectX 9.1
- Next-generation cinematic graphics with full programmability
- Full 128-bit floating-point precision graphics pipeline
- Outputs: Two DVI-I connectors and one VESA three-pin stereo synch connector
- x16 PCI Express bus interface

**Additional information**

- Optimized and certified for all leading workstation applications
- Hardware accelerated antialiased points and lines
- Hardware OpenGL overlay planes
- Hardware accelerated two-sided lighting
- OpenGL quad-buffered stereo
- Highest precision pixel shading — native, optimized FP32 processing
- Broad operating system support including Windows XP, Windows 2000, and Linux
- Advanced multidisplay desktop and application management seamlessly integrated into Microsoft Windows

NVIDIA nView display technology allows a single PCI Express adapter to independently support any two of the following displays:

- Analog CRT monitor
- Digital CRT monitor
- Analog flat panel
- Digital flat panel

**Technical capabilities**

- 128 MB of 256-bit DDR SDRAM memory interface
- Dual 400 MHz RAMDACs supporting a primary display and a secondary analog display resolution up to 2048 x 1536 at 85 MHz per display
- 12-bit sub-pixel precision
- Eight pixels per clock rendering engine / eight graphics pipelines
- 16x full-screen antialiasing (FSAA)

**Display modes:** The NVIDIA Quadro FX 1400 supports the following screen resolutions and refresh rates:

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Color</th>
<th>Refresh rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>320 x 200</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>320 x 240</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>400 x 300</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>480 x 360</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>512 x 384</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>640 x 400</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>640 x 480</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>800 x 600</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1024 x 768</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1152 x 864</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1280 x 960</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1280 x 1024</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1600 x 900</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100</td>
</tr>
<tr>
<td>1600 x 1200</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1792 x 1344</td>
<td>8, 16, 32</td>
<td>60, 75</td>
</tr>
<tr>
<td>1856 x 1392</td>
<td>8, 16, 32</td>
<td>60, 75</td>
</tr>
<tr>
<td>1920 x 1080</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100</td>
</tr>
<tr>
<td>1920 x 1200</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1920 x 1440</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>2048 x 1536</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75</td>
</tr>
</tbody>
</table>

**Advanced 3D graphics**

**NVIDIA Quadro FX 1400 128 MB PCI Express video adapter**

This adapter includes:

- NVIDIA NV41GL graphics processing unit
- Full support for Shader Model 3.0 / DirectX 9.1
- Next-generation cinematic graphics with full programmability
- Full 128-bit floating-point precision graphics pipeline
**High advanced 3D graphics**

**NVIDIA Quadro FX 3400 256 MB PCIe Express Adapter:**
This adapter includes:

- NVIDIA NV45GL video chip
- Next-generation cinematic graphics with full programmability
- Full 128-bit floating-point precision graphics pipeline
- VESA 3-pin stereo synch connector
- x16 PCI Express support
- 12-bit subpixel precision
- Optimized and certified for all leading workstation applications
- Hardware accelerated antialiased points and lines
- Hardware OpenGL overlay planes
- Hardware accelerated two-sided lighting
- Fully compliant with OpenGL 2.0 and DirectX 9.0
- OpenGL quad-buffered stereo
- Broad operating system support including Windows XP, Windows 2000, and Linux XFree86
- Advanced multidisplay desktop and application management seamlessly integrated into Microsoft Windows

NVIDIA nView display technology allows a single PCI Express adapter to independently support any two of the following displays:

- Analog CRT monitor
- Digital CRT monitor
- Analog flat panel
- Digital flat panel

**Technical capabilities**

- 256 MB of 256-bit, GDDR3 SDRAM memory interface
- Dual 400 MHz RAMDACs supporting a primary display and a secondary analog display resolution up to 2048 x 1536 at 85 MHz per display
- 8 pixels per clock rendering engine
- 12 programmable shader units
- 16x FSAA

**Display modes:** The NVIDIA Quadro FX 3400 PCIe supports the following screen resolutions and refresh rates:

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Color bits</th>
<th>Refresh rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>320 x 200</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>320 x 240</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>400 x 300</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>480 x 360</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>512 x 384</td>
<td>8, 16, 32</td>
<td>60, 70, 75</td>
</tr>
<tr>
<td>640 x 400</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>640 x 480</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>800 x 600</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1024 x 768</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1152 x 864</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1280 x 720</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1280 x 960</td>
<td>8, 16, 32</td>
<td>60, 70, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1536 x 1024</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85, 100, 120</td>
</tr>
<tr>
<td>2048 x 1536</td>
<td>8, 16, 32</td>
<td>60, 70, 72, 75, 85</td>
</tr>
<tr>
<td>3840 x 2400</td>
<td>8, 16, 32</td>
<td>13, 20, 24, 25</td>
</tr>
</tbody>
</table>

**Extreme 3D graphics**

**3Dlabs Wildcat Realizm 800 640 MB PCIe Express video adapter** This adapter includes:

- Dual 3Dlabs P20 VPUs and one 3Dlabs W20 geometry and bus interface chip
- x16 PCI Express graphics card that is compliant with the PCI Express high-end graphics electromechanical specification
- 32 programmable 36-bit Vertex shaders supporting up to 1K instructions, 32 light sources, subroutines, loops, and conditionals
- SuperScene multisampling support at 4, 8, or 16 samples per pixel
- 96 programmable fragment shaders supporting up to 256K instructions, subroutines, loops, and predicates
- VESA 3-pin stereo synch connector for OpenGL quad-buffered stereo
- Optimized and certified for all leading workstation applications
- Programmable pixel shader
- Optional Multiview and Genlock support via a paddle card that occupies the space of a third, but user selectable slot in the chassis
- OpenGL 1.5 with OpenGL Shading Language (glslang) V1.05 support
- DirectX 9 with high-level Shader Language (HLSL) V2.x support
- Broad operating system support including Windows 2000, and both 32- and 64-bit versions of Windows XP and Linux
Two dual link DVI-I ports supporting the following configurations:
- One analog display device
- Two analog display devices
- One single-link or dual-link digital display device
- Two single-link or dual-link digital display devices
- One single-link or dual-link digital display device and one analog display device

Technical capabilities
- 512 MB of 512-bit (256 MB, 256-bit per VPU), GDDR3 SDRAM unified memory interface
- 128 MB of 128-bit, GDDR3 SDRAM direct burst memory interface
- Two Video Output interfaces capable of both analog and digital with a 10-bit analog RAMDAC at speeds up to 400 MHz and digital interface at speeds up to 165 MHz
- DDC2B+ support

Display modes: The 3DLabs Wildcat Realizm PCIe supports the following screen resolutions and refresh rates:

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Color bits</th>
<th>Refresh rate (Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>640 x 480</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 120</td>
</tr>
<tr>
<td>800 x 600</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 120</td>
</tr>
<tr>
<td>856 x 480</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1024 x 768</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 112, 120</td>
</tr>
<tr>
<td>1152 x 720</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 112, 120</td>
</tr>
<tr>
<td>1152 x 864</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 112, 120</td>
</tr>
<tr>
<td>1280 x 960</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 106, 112, 118, 120</td>
</tr>
<tr>
<td>1280 x 1024</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 106, 112, 118, 120</td>
</tr>
<tr>
<td>1360 x 766</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 112, 120</td>
</tr>
<tr>
<td>1440 x 900</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 120</td>
</tr>
<tr>
<td>1520 x 856</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100, 106, 120</td>
</tr>
<tr>
<td>1600 x 1200</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100</td>
</tr>
<tr>
<td>1920 x 1080</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100</td>
</tr>
<tr>
<td>1920 x 1200</td>
<td>8, 16, 32</td>
<td>60, 75, 85, 100</td>
</tr>
<tr>
<td>2048 x 1536</td>
<td>8, 16, 32</td>
<td>60</td>
</tr>
<tr>
<td>2456 x 1536</td>
<td>8, 16, 32</td>
<td>60</td>
</tr>
<tr>
<td>2560 x 1440</td>
<td>8, 16, 32</td>
<td>60</td>
</tr>
<tr>
<td>2728 x 1536</td>
<td>8, 16, 32</td>
<td>60</td>
</tr>
<tr>
<td>3840 x 2400</td>
<td>8, 16, 32</td>
<td>24</td>
</tr>
</tbody>
</table>

Maximum analog resolution: 2728 x 1536
Maximum digital resolution: 3840 x 2400 (48 Hz)

Software information
The new IntelliStation A Pro models were tested for compatibility with the Microsoft Windows XP Professional and Red Hat Enterprise Linux WS 3 operating system.

Depending on the model, the following types of software are included with the system:
- Operating system preloaded
- Delivered on CD-ROM: Selected device drivers
- Software license allows you to use specific licensed software available from IBM
- IBM Director Agent software is available from http://www-1.ibm.com/servers/eserver/xseries/systems_management/xseries_sm.html

Microcode: The IntelliStation A Pro system uses flash BIOS, which supports the following features:
- PCI BIOS Specification V2.2
- Plug-and-play BIOS Specification V1.0A
- DMI BIOS Specification V2.0

Preload image recovery: Selected models are preloaded with Microsoft Windows XP Professional or Red Hat Enterprise Linux WS 3. Preload image recovery is enabled through disk-to-disk recovery, product recovery CDs, or operating system CDs.

Disk-to-disk product recovery: The new IntelliStation A Pro systems preinstalled with operating systems have a unique partition on the HDD for product recovery. If the preload image is corrupted, the original image can be retrieved from the recovery partition.

Product recovery CD: Product recovery CDs are available as field-replaceable units (FRUs) for systems preloaded with Microsoft Windows XP Professional with the option to fully recover and restore the original preload image of the operating system, including most original device drivers and all applications after formatting the HDD.
<table>
<thead>
<tr>
<th>Description</th>
<th>Preload Software (Image)</th>
<th>DD CD</th>
<th>BIOS</th>
<th>License</th>
<th>Web</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIOS</strong></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash BIOS</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating system</strong></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microsoft Windows XP Professional</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Hat Enterprise Linux WS 3</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Online books</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User’s guide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set up your Network icon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>IBM Director Agent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tivoli Management Agent (TMA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Applications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM Product Registration (Intelliquest/N Aviant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Acrobat Reader</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>PC Doctor for Windows</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Norton Antivirus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>IBM Record Now (CD-RW only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>IBM Drive Letter Access (CD-RW only)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Device drivers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio-RealTec AC97</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>WDM ALC655</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>SCSI ADAPTEC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>AIC7902W U320</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Serial-ATA 3512A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Nvidia nForce</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>I/O processor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>AMD 8131 PCI-X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>AMD 8111 SMBus V2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Serial-ATA 3512A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>AMD 8111 System Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>AC’97 Audio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>IDE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>HPET</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>USB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Ethernet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Broadcom Ethernet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>BASP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>IBM PS/2® 3-button Mouse (Multilingual)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>IBM PS/2 Keyboard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>48x CD-ROM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Firewire 1394A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ASF 1.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>USB 2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>NVIDIA Quadro</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>NVS 280 graphics adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>FX 1400 graphics adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>FX 3400 graphics adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3DLabs Wildcat Realizm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>800 graphics adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>All drivers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

6 Applications and device drivers may vary from the retail version and may not include all functions and documentation. Not all applications are available separately; titles are subject to change.
Application descriptions

IBM Product Registration: This program allows users to register with IBM.

Acrobat Reader (Windows models only): View .pdf files, a common format for text and Web documentation.

PC Doctor for Windows (Windows models only): Test hardware in the Windows environment.

Norton AntiVirus for IBM (OEM Version) (Windows models only): Detect and remove viruses from your computer.

IBM Record Now (Windows models only with CD-RW/combo models only): Create a CD or CD image from a selected set of files.

IBM Driver Letter Access (Windows models only with CD-RW/combo models only): Copy files to and from a writable CD through Windows Explorer.

Plug-and-play support (Windows models only): Plug-and-play specifications make it easier for users to install, upgrade, and make changes to their PCs. Systems that use plug-and-play adapter cards are self-configuring.

PC-Doctor Diagnostics for DOS (PC-Doctor, Inc.): These diagnostic tools for isolating problems also provide information about your computer operating system environment and installed features. Support documentation is built into the help system. These tools are available on the service/recovery partition.

Education support

No self-study or classroom courses are available specifically for the IntelliStation A Pro workstation.

Call IBM Education and Training at 800-IBM-TEACH (426-8322) for education catalogs, schedules, and enrollments.

Publications

The following publications are shipped with the IntelliStation A Pro system.

<table>
<thead>
<tr>
<th>Part number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>31R1983</td>
<td>IntelliStation Installation Guide</td>
</tr>
<tr>
<td>31R1986</td>
<td>IntelliStation Device Driver CD</td>
</tr>
<tr>
<td>31R1985</td>
<td>IntelliStation Documentation CD</td>
</tr>
</tbody>
</table>

The following software documentation is shipped with models that have Microsoft Windows XP Professional preinstalled.

<table>
<thead>
<tr>
<th>Part number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>32P4672</td>
<td>Microsoft Windows XP Professional</td>
</tr>
</tbody>
</table>

The IntelliStation User's Guide and Hardware Maintenance Manual, in U.S. English versions, are available from

http://www.ibm.com/pc/support

Click workstations, then the workstation family, then Online Publications.

Services

Integrated Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure for e-business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

http://www.ibm.com/services/

For details on education offerings related to specific products, visit


Select your country, and then select the product as the category.

Technical information

HDD specifications

<table>
<thead>
<tr>
<th>Part number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 GB(7)</td>
<td>73.4 GB</td>
</tr>
<tr>
<td>SATA</td>
<td>Ultra320 SCSI</td>
</tr>
</tbody>
</table>

Formatted capacity

Average read seek time (typical)

Average latency

S.M.A.R.T.

rpm

7 GB equals 1,000,000,000 bytes when referring to HDD capacity; accessible capacity may be less.

48x-32x-48x-16x Max CD-RW/DVD-ROM combination drive specifications

- Write speed:
  - CD-R media: 48x max (3.0 to 7.2 MB/s) CAV
  - CD-RW media
    -- Multispeed: 4x (0.6 MB/s) CLV
    -- High-speed: 10x (1.5 MB/s) CLV
    -- Ultraspeed: 24x max (2.4 to 3.6 MB/s) CAV
    -- Ultraspeed Plus: 32x max (3.0 to 4.8 MB/s) PCAV

- Read speed:
  - Sustained data transfer rates:
    -- DVD-ROM (6.5x-16x CAV, 4.7 GB DVD-ROM read): 8.7 to 22.1 MB/s
    -- DVD-ROM (3.3x-8x CAV, 8.5 GB Dual-layer read): 4.4 to 11.0 MB/s
    -- DVD-R (2.5x-6x CAV, 4.7 GB DVD-R read): 3.3 to 8.1 MB/s
    -- DVD+R (2.5x-6x CAV, 4.7 GB DVD+R read): 3.3 to 8.1 MB/s
    -- DVD-R (2.5x-5x CAV, 3.95 GB DVD-R read): 3.3 to 6.7 MB/s
- DVD-RAM (2x CLV, 4.7 GB DVD-RAM read): 2.7 MB/s
- DVD-RW (2.5x-6x CAV, 4.7 GB DVD-RW read): 3.3 to 8.1 MB/s
- DVD+RW (2.5x-6x CAV, 4.7 GB DVD+RW read): 3.3 to 8.1 MB/s
- CD-ROM (20x-48x CAV, CD-ROM read): 3.0 to 7.2 MB/s
- CD-R (18x-40x CAV, CD-R read): 2.7 to 6.0 MB/s
- CD-RW (16x-32x CAV, CD-RW read): 2.4 to 4.8 MB/s

- Max burst data transfer rate: Ultra DMA Mode 2: 33 MB/s
- Average access times:
  - DVD-ROM including latency, single layer: 120 ms
  - CD-ROM including latency: 110 ms
  - CD-RW including latency: 110 ms
  - 2 MB data buffer

Note: Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

Multi-Burner: Performance specifications
- Maximum sustained data transfer rates:
  - Read/write: 4.7/9.4 GB DVD-RAM: 3x (4.1 MB/s) (ZCLV) (write verify off)
  - Read:
    - 2.6 GB DVD-RAM: 2x (2.8 MB/s) (ZCLV)
    - 4.7 GB DVD-ROM: 12x (16.6 to 6.8 MB/s) (CAV)
    - 8.5 GB DVD-ROM: 8x (11.0 to 4.5 MB/s) (CAV)
    - 4.7 GB DVD-R/DVD-RW: 8x (11.0 to 4.5 MB/s) (CAV)
    - 7.7 GB DVD+R/DVD+RW: 8x (11.0 to 4.5 MB/s) (CAV)
    - 650 MB CD-ROM/R: 32x (4.8 to 2.0 MB/s) (CAV)
    - 650 MB CD-RW: 24x (3.6 to 1.5 MB/s) (CAV)
    - Write:
      - 4.7 GB DVD-R: 8x (11.0 to 5.4 MB/s) (ZCLV)
      - 4.7 GB DVD-RW: 4x (5.5 MB/s) (CLV)
      - 4.7 GB DVD+R: 8x (11.0 to 5.4 MB/s) (ZCLV)
      - 4.7 GB DVD+RW: 4x (5.5 MB/s) (CLV)
      - 650 MB CD-R: 24x (3.6 to 1.8 MB/s) (ZCLV)
      - 650 MB CD-RW: 16x (2.4 to 1.8 MB/s) (ZCLV)
- Maximum burst data transfer rates:
  - Ultra DMA Mode 4: 66.6 MB/s
  - Multiword DMA Mode 2: 16.6 MB/s
  - ATA PIO Mode 4: 16.6 MB/s
- Average access times:
  - CD-ROM/R: 110 ms
  - DVD-ROM/R: 130 ms
  - DVD-RAM: 150 ms

Note: CD/DVD drive speeds list maximum rates; rates are variable and are often less than the maximum possible.

Mechanical specifications

Dimensions/weights:
- Height: 438 mm (17.25 in)
- Width: 165 mm (6.50 in)
- Depth: 483 mm (19.00 in)
- Weight: 16.3 kg (36.0 lb) to 20.8 kg (45.8 lb) (depending on configuration)

Electrical power specifications
- 530-watt supply continuous
- Sine-wave (50 or 60 Hz) required
- Input voltage and frequency ranges automatically selected
- Built-in overload and surge protection
- 90 to 137 (nominal) V ac; 50 or 60 Hz; 8.0 A (maximum)
- 180 to 265 (nominal) V ac; 50 or 60 Hz; 4.0 A (maximum)
- Input kilovolt-amperes (kVA) (approximately)
  - Minimum configuration: 0.13 kVA
  - Maximum configuration: 0.55 kVA

Ambient air temperature specifications
- System on: 10° to 35°C (50° to 95°F) at 0 to 2,134 m (0 to 7,000 ft)
- System off: -40° to 60°C (-40° to 140°F) at 0 to 2,134 м (0 to 7,000 ft)

Shipping specifications: Approximate shipping dimensions and weight:
- Single pack dimensions: 25.50 x 10.63 x 24.00 in
- Single pack weight: 44.72 lb
- Quantity per pallet: 12
- Estimated safe stacking: 4 high

Noise level specifications: Declared acoustical noise emissions: Sound power levels
- 4.7 bels (idling)
- 5.1 bels (operating)

Note: The noise emission level stated is the declared (upper limit) A-weighted sound power level, in bels, for a random sample of machines, typically configured and operating in idle mode (powered on, but no DASD read/write or other I/O activity). All measurements have been made in accordance with ANSI S12.10 and reported in conformance with ISO 9296.

Equipment approvals
- FCC — Certified to comply with Part 15 FCC Rules, Class B limits
- ICES-003 — Canada
- NMB-003 — du Canada
- IEC 950 Second Edition with 1, 2, and 3 amendments
- C22. No. 950 — Canada
- NOM — (Mexico — Legal Requirement)

Operating environment
- Temperature:
  - 10° to 35°C (50° to 95°F) (server on)
  - -40° to 60°C (-40° to 140°F) (server off)
- Relative humidity: 8% to 80%
- Maximum altitude: 2,133 m (7,000 ft)

Hardware requirements

Monitors: IBM monitors supported by the IntelliStation A Pro workstation will be reflected in the compatibility report to be made available to marketing and support channels when testing is complete.

Software requirements: The new IntelliStation A Pro models were tested for compatibility with Microsoft Windows XP Professional and Red Hat Enterprise Linux WS 3.
**Systems compatibility report:** The IntelliStation A Pro workstation has been tested for compatibility with numerous devices.

To view IntelliStation compatibility reports, visit


For software not included in the compatibility test report, contact the manufacturer or place of purchase to validate compatibility.

**Limitations**

- Memory must be installed in pairs and each CPU card must have at least one pair of memory installed.
- To address more than 4 GB of memory address space, an operating system with such addressing capability is required.

**Note:** Maximum memory may require replacement of standard memory with optional maximum memory modules and second CPU must be installed.

- PCI-X slot 2 will support 2/3 length cards (9.9-in x 4.2-in).
- Zero-channel RAID (ZCR) must be installed in slot three.
- Wake on LAN is not supported if systems are improperly shut down.
- To install a SCSI driver when using Microsoft Windows XP Professional, you must use a standard diskette drive.
- Graphics:
  - The 3DLabs Wildcat Realizm 800 require the external PCI Express power direct from the power supply.
  - Slot 4 will not be available when using the 3DLabs Wildcat Realizm 800 graphics adapter.
- HDD: 5.25-inch bays do not support 10K rpm, or faster, HDDs.
- Power supply: The IntelliStation workstation uses an optimum power supply to meet most configuration requirements for this class of system. Certain very rich configurations may exceed available power. Ensure that adequate power is available for all your configured devices including drives, memory, and adapter cards.

**Planning information**

**Customer responsibilities:** The IntelliStation A Pro system is designated as customer setup (CSU). CSU allowance is one day.

**Cable orders:** Except for system power, keyboard, and mouse connections, there are no cabling requirements. All cables are provided with the system unit, and the instructions are provided as part of initial setup.

SCSI models require a cable (24P7929) to connect external SCSI devices.

All SCSI models have internal SCSI cable to enable the installation of internal Ultra320 SCSI HDD. This is a 4-drop SCSI cable. This SCSI cable is not included with the SATA models.

**Installability:** The IntelliStation system is designed to function in a vertical position. Proper installation requires the feet to be deployed to assist in the prevention of the tower tipping over.

Following the setup instructions, attach the keyboard and peripherals. Turn on the power. Setup is run after the computer has successfully completed its initial self-tests.

The setup utility resides in ROM. In some instances, you will be prompted to run this utility, or you can invoke it by pressing the F1 key during memory POST.

The IntelliStation A Pro workstation has a universal power supply that operates with either 115 or 230 V ac. The power supply has an auto-sense design that automatically determines the correct operating voltage. All power supplies have built-in overload protection and surge protection.

**Packaging**

- System unit carton
  - System unit (6217)
  - Hardware assembly package
  - Power cord (U.S. and Canada — 110 V ac)
  - Keyboard, mouse
  - Hardware publications CD
  - Software publications package
- Operating system package
  - Operating system

**Security, auditability, and control**

**Improved asset protection:** The IntelliStation A Pro systems have two key focus areas: better system security and better data protection. The IntelliStation A Pro workstation is equipped with a range of features that address both of these focus areas.

System security includes theft deterrence and detection of system tampering. The IntelliStation A Pro workstation has the following security attributes:

- Alert Standard Format (ASF)
- Asset control and monitoring:
  IBM Director Agent, the chassis intrusion switch, and ASF help to ensure that network administrators are notified when an IntelliStation A Pro workstation is opened without authorization. The administrator can then take appropriate action to prevent system tampering or theft.
Data protection ensures data integrity and prevents its loss. The IntelliStation A Pro workstation has the following data protection attributes:

- Error checking and correction
- S.M.A.R.T. analysis:
  All models have S.M.A.R.T. HDDs to warn users and network administrators when an HDD failure may be imminent by measuring parameters such as rotation speed and head wear. In the case of predictable failures, you can avoid costly data loss by backing up data and replacing the HDD.
- Virus protection:
  Each IntelliStation A Pro workstation is shipped with Norton AntiVirus for IBM (OEM Version) software.

The IntelliStation A Pro workstation supports the following security features:

- Cover key lock
- U-bolt anchoring option
- Security slot (for attachment of optional cable lock such as Kensington cable lock)
- Cover tamper detect switch
- Secure fixed DASD
- Power-on password
- Administration password
- Setup utility password (administrator password)
- Keyboard/mouse password
- Boot sequence control
- Boot without keyboard or mouse
- Diskette boot inhibit
- Disable mouse
- Diskette write-protect
- Diskette I/O control
- HDD I/O control
- Serial port I/O control
- Parallel port I/O control
- Secure access openings (vents, louvers)
- Vital product data stored in on-board flash ROM
- Write protection control circuit for flash ROM

To assist in security, systems management, and asset management, the following system identifiers (vital product data) are provided:

- Machine type and model
- System serial number
- Manufacturing identifier

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

Terms and conditions

IBM Global Financing: Yes

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM. In the United States, call 800-IBM-SERV (426-7378), or write to

Warranty information
P.O. Box 12195
Research Triangle Park, NC 27709
Attn: Dept JDJA/B203

Warranty period

- System hardware —Three years
- Optional features —One year

Optional IBM features initially installed in an IBM system carry the same warranty period as the system. If installed after the initial system installation, they carry the balance of the system warranty or the optional feature warranty, whichever is greater.

Warranty service: If required, IBM provides repair or exchange service depending on the type of warranty service specified below for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM’s normal service area. Contact your local IBM representative or your reseller for country- and location-specific information.

Customer replaceable unit (CRU) (keyboard, mouse, speaker, memory, HDD), and on-site service for other selected parts.

CRU service: IBM provides replacement CRUs for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU. Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU, at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge under the type of warranty service specified below (on-site service).

Based upon availability, CRUs will be shipped for next business day delivery. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required:

- Return instructions and a container are shipped with the replacement CRU.
- You may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:

- Battery
- CD-ROM drive
- DVD-ROM drive
- HDD
- Lift handle kit
- Memory DIMM
- Memory expansion card
- PCI adapters
- PCI divider
- Power cord
- Service label
- System labels
- Top cover
- Voltage regulator module

On-site service: IBM On-site repair (IOR), 9 hours per day, Monday through Friday excluding holidays, next-business-day (NBD) response. IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. On-site service is not available in all countries, and some countries have kilometer or mileage limitations from an
IBM service center. In those locations where on-site service is not available, the normal in-country service delivery is used.

Call IBM at 800-IBM-SERV (426-7378), to assist with problem isolation for hardware, to determine if warranty service is required. Telephone support may be subject to additional charges, even during the limited warranty period.

**International Warranty Service (IWS):** IWS is available during the warranty period to customers who travel or relocate to countries where their computer is sold and serviced by IBM or IBM resellers authorized to perform warranty service. Eligible IBM computers are identified by their four-digit machine type.

You can obtain IWS through the method of service, such as CRU, depot, carry-in, or on-site, provided in the servicing country. Service methods and procedures vary by country, and some service or parts may not be available in all countries. Service centers in certain countries may not be able to service all models of a particular machine type. In addition, some countries may have fees and restrictions that apply at the time of service.

To determine the eligibility of your computer and to view a list of countries where service is available, visit


For more information on IWS, refer to Services Announcement 601-034, dated September 25, 2001.

**Note:** Due to the earth’s magnetic field, CRT monitors are manufactured to work in northern, southern, and equatorial regions of the earth and may not produce a satisfactory image when moved between them. Any required adjustment (if possible) is not covered under IWS and may be subject to a chargeable action. The magnetic field does not affect flat-panel LCD monitors.

**Licensing:** Programs included with this product are licensed under the terms and conditions of the license agreements that are shipped with the system.

**Maintenance services — ServiceElect and ServiceSuite**

ServiceElect and ServiceSuite provide hardware warranty service upgrades, maintenance, and selected support services in one agreement.

**Warranty service upgrade:** During the warranty period, warranty service upgrades provide an enhanced level of on-site service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site service acquired by the customer. Service levels are response time objectives and are not guaranteed.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

CRUs will be provided as part of the machine’s standard warranty CRU service except that you may install a Tier 1 CRU yourself or request IBM installation, at no additional charge, under one of the on-site service levels specified below.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

The following warranty service upgrade options are available:

- IOR, 9 hours per day, Monday through Friday excluding holidays, 4-hour average response.
- IOR, 24 hours per day, 7 days a week, 4-hour average response.

**Maintenance service:** If required, IBM provides repair or exchange service depending on the type of maintenance service specified below for the machine. An IBM technician will attempt to resolve your problem over the telephone. You must follow IBM’s problem determination and resolution procedures. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed.

**CRU service:** If your problem can be resolved with a CRU (keyboard, mouse, speaker, memory, HDD), IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request.

IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required:

- Return instructions and a container are shipped with the replacement CRU.
- You may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

**On-site service:** IOR, IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

The following on-site service options are available:

- IOR, 9 hours per day, Monday through Friday excluding holidays, NBD response.
- IOR, 9 hours per day, Monday through Friday excluding holidays, 4-hour average response.
- IOR, 24 hours per day, 7 days a week, 4-hour average response.

**Maintenance service (ICA)**

Maintenance services are available for ICA legacy contracts. The preferred go-to-market offerings are ServiceElect. However, ICA legacy contracts will still be available for current customers until they are withdrawn.

**Alternative service (Warranty service upgrades):** During the warranty period, warranty service upgrades provide an enhanced level of on-site service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site...
IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

CRUs will be provided as part of the machine’s standard warranty CRU Service except that you may install a Tier 1 CRU yourself or request IBM to install it, at no additional charge under the type of warranty service specified below, on-site service.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

The following warranty service upgrade option is available.

- **IOR, 24 hours per day, 7 days a week, 4-hour average response.**

**Maintenance service:** If required, IBM provides repair or exchange service depending on the type of maintenance service specified below for the machine. An IBM technician will attempt to resolve your problem over the telephone. You must follow IBM’s problem determination and resolution procedures. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed.

**CRU service:** If your problem can be resolved with a CRU (keyboard, mouse, speaker, memory, HDD), IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request.

IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required:

- Return instructions and a container are shipped with the replacement CRU.
- You may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

**On-site service:** IOR, IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

The following on-site service options are available:

- **IOR, 9 hours per day, Monday through Friday excluding holidays, NBD.**
- **IOR, 24 hours per day, 7 days a week, same-day response.**

**Non-IBM parts support**

**Warranty service:** IBM is now shipping machines with selected non-IBM parts that contain an IBM field replaceable unit (FRU) part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their customers, and normal warranty service procedures for the IBM machine apply.

**Warranty service upgrades and maintenance services:** Under certain conditions, IBM Integrated Technology Services repairs selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

IBM service provides hardware problem determination on non-IBM parts (adapter cards, PCMCIA cards, disk drives, memory, and so forth) installed within IBM systems covered under warranty service upgrades or maintenance services and provides the labor to replace the failing parts at no additional charge. If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

**IBM hourly service rate classification:** One

**ServicePac® offerings**

**Warranty and maintenance options:** The announced products may be eligible for ServicePacs for warranty and maintenance options, convenient prepackaged offerings for warranty service upgrades and maintenance services.

**Installation services:** The announced products may be eligible for ServicePacs for Installation Services, convenient prepackaged offerings for installation services. Refer to the **Prices** section for information on the availability of ServicePac offerings.

For additional ServicePac information, visit


**Field-installable features:** Yes

**Model conversions:** No

**Machine installation:** Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

**Graduated program license charges apply:** No. This product does not contain licensed internal code or licensed machine code.
## Prices

<table>
<thead>
<tr>
<th>Description</th>
<th>Machine type/model</th>
<th>Part number</th>
<th>IBM list price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2 GHz DC, 1 MB, 2 x 1024 MB memory, 80 GB SATA, DVD/CD-RW, Ethernet, 1394, Windows XP, NVIDIA Quadro FX 1400</td>
<td>6217-62U 621762U</td>
<td>$ 5,649</td>
<td></td>
</tr>
<tr>
<td>2 x 2.2 GHz DC, 1 MB, 4 x 512 MB memory, 73.4 GB 10K SCSI, DVD/CD-RW, Ethernet, 1394, Windows XP, 3Dlabs Wildcat Realizm 800</td>
<td>6217-68U 621768U</td>
<td>10,980</td>
<td></td>
</tr>
<tr>
<td>2 x 2.4 GHz 1 MB, 2 x 1024 MB memory, 80 GB SATA, DVD/CD-RW, Ethernet, 1394, Windows XP, NVIDIA Quadro FX 1400</td>
<td>6217-21U 621721U</td>
<td>5,349</td>
<td></td>
</tr>
<tr>
<td>2 x 2.4 GHz 1 MB, 4 x 1024 MB memory, 73.4 GB 10K SCSI, DVD/CD-RW, Ethernet, 1394, Windows XP, NVIDIA Quadro FX 1400</td>
<td>6217-28U 621728U</td>
<td>7,909</td>
<td></td>
</tr>
<tr>
<td>2.6 GHz 1 MB, 2 x 1024 MB memory, 80 GB SATA, DVD/CD-RW, Ethernet, 1394, Windows XP, NVIDIA Quadro NVS 280</td>
<td>6217-30U 621730U</td>
<td>4,349</td>
<td></td>
</tr>
<tr>
<td>2.6 GHz 1 MB, 2 x 1024 MB memory, 73.4 GB 10K SCSI, DVD/CD-RW, Ethernet, 1394, Windows XP, NVIDIA Quadro FX 1400</td>
<td>6217-33U 621733U</td>
<td>5,259</td>
<td></td>
</tr>
<tr>
<td>2 x 2.6 GHz 1 MB, 2 x 1024 MB memory, 80 GB SATA, Multiburner, Ethernet, 1394, Windows XP, 3Dlabs Wildcat Realizm 800</td>
<td>6217-35U 621735U</td>
<td>8,065</td>
<td></td>
</tr>
<tr>
<td>2 x 2.6 GHz 1 MB, 4 x 1024 MB memory, 80 GB SATA, Multiburner, Ethernet, 1394, Windows XP, NVIDIA Quadro FX 1400</td>
<td>6217-36U 621736U</td>
<td>7,545</td>
<td></td>
</tr>
</tbody>
</table>

---

### ServicePac for warranty and maintenance

**Larger systems (more than 4 bays 4 slots)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-year IOR 9 x 5 4-hour average response</td>
<td>41L2735</td>
</tr>
<tr>
<td>3-year IOR 24 x 7 4-hour average response</td>
<td>41L2741</td>
</tr>
<tr>
<td>4-year IOR 9 x 5 NBD</td>
<td>69P9164</td>
</tr>
<tr>
<td>4-year IOR 9 x 5 4-hour average response</td>
<td>69P9165</td>
</tr>
<tr>
<td>4-year IOR 24x7 4-hour average response</td>
<td>69P9166</td>
</tr>
</tbody>
</table>

### ServicePac for post warranty

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-year IOR 9 x 5 NBD</td>
<td>69P9353</td>
</tr>
<tr>
<td>1-year IOR 9 x 5 x 4</td>
<td>69P9354</td>
</tr>
<tr>
<td>1-year IOR 24 x 7</td>
<td>69P9355</td>
</tr>
<tr>
<td>2-year IOR 9 x 5 NBD</td>
<td>96P2135</td>
</tr>
<tr>
<td>2-year IOR 9 x 5 x 4</td>
<td>96P2136</td>
</tr>
<tr>
<td>2-year IOR 24 x 7 x 4</td>
<td>96P2224</td>
</tr>
</tbody>
</table>
ServicePac for installation services

<table>
<thead>
<tr>
<th>Description</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic install 1 to 25 units</td>
<td>21P2001</td>
</tr>
</tbody>
</table>

For ServicePac prices, visit


Maintenance service charges (legacy)

Alternative service (Warranty service upgrades)

IOR
24 x 7
$249

Maintenance service

IOR IOR
9 x 5 24 x 7
$480 $720

For ServiceElect (ESA) maintenance service charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

IBM Global Financing: IBM Global Financing offers competitive financing to credit-qualified customers to assist them in acquiring IT solutions. Offerings include financing for IT acquisition, including hardware, software, and services, both from IBM and other manufacturers or vendors. Offerings (for all customer segments: small, medium, and large enterprise), rates, terms, and availability can vary by country. Contact your local IBM Global Financing organization or visit

http://www.ibm.com/financing

IBM Global Financing offerings are provided through IBM Credit LLC in the United States and other IBM subsidiaries and divisions worldwide to qualified commercial and government customers. Rates are based on a customer’s credit rating, financing terms, offering type, equipment type, and options, and may vary by country. Other restrictions may apply. Rates and offerings are subject to change, extension, or withdrawal without notice. Financing solutions from IBM Global Financing can help you stretch your budget and affordably acquire the new product. But beyond the initial acquisition, our end-to-end approach to IT management can also help keep your technologies current, reduce costs, minimize risk, and preserve your ability to make flexible equipment decisions throughout the entire technology life cycle.

Trademarks

ServiceSuite is a trademark of International Business Machines Corporation in the United States or other countries or both.
IntelliStation, Wake on LAN, NetView, Tivoli, eServer, xSeries, PS/2, and ServicePac are registered trademarks of International Business Machines Corporation in the United States or other countries or both.
Microsoft and Windows are trademarks of Microsoft Corporation.
Linux is a trademark of Linus Torvalds in the United States, other countries or both
Other company, product, and service names may be trademarks or service marks of others.