

System Requirements

The SAS[®] System Release 8.2 (TS2M0) CMS

This document provides requirements for installing and running the SAS System for CMS. You must update your system to meet the minimum requirements before running the SAS System. The major requirements listed in the document are:

- Software Requirements
- Hardware Requirements
- Space Requirements
- Specific Product Requirements
- Graphics Hardware and Software Compatibility

For additional information and to view the latest system requirements for your system, access the following Web site:

<http://www.sas.com/newversion>

or contact SAS Institute Technical Support (refer to "Contacting SAS Institute" in the Installation Instructions included in your package).

Software Requirements

Operating System

- VM/ESA, Version 2, Release 2.0 or subsequent releases: CMS, Level 13 or higher

Hardware Requirements

Machines Supported

- IBM System 390

Tape Drives Supported

- 9-track (1600 bpi or 6250 bpi)
- IBM 3480 compatible drives
- IBM 3590 compatible drives

Distribution Media

- Cartridges for IBM 3480 drives
- Cartridges for IBM 3590 drives

Memory Requirements

Most SAS procedures need a minimum of 10 MB of virtual storage to execute if the SAS System is installed in saved segments. Some procedures, such as GLM and NETFLOW, may require more virtual storage. If the SAS System is not installed in saved segments, most SAS procedures need a minimum of 32 MB. Note that the installation of the SAS System itself will require 32 MB of storage because the process requires executing the newly installed modules before they are saved into segments.

SAS Institute strongly recommends installing the entire SAS System in saved segments to reduce memory requirements and improve performance. Depending on the set of products installed, the size of the saved segments can range up to 90 MB for code alone or 290 MB including messages and SASHELP.

Release 8.2 of the SAS System can fully utilize all storage in XA machines. Full XA exploitation of the storage allocated above or below the 16 MB line is provided. When installing the SAS System in saved segments, the system must be placed above 16 MB.

Space Requirements

The media you received is customized for your site and contains all of the SAS software products for which you are licensed.

In the installation procedures for Release 8.2, you can have disk space requirements automatically generated for you. For instructions, see the **Installation Instructions and System Manager's Guide for Release 8.2 (TS2M0) of the SAS System under CMS**. To determine disk space requirements manually, use the tables that follow.

Below are the space requirements for all of the products available with Release 8.2 (TS2M0) of the SAS System. These requirements reflect the number of **4K-byte** blocks required for each product. If you are installing SAS software on an FBA disk (3310 or 3370), allocate eight blocks of 512 bytes for each 4K-byte block. If you are installing SAS software on a CKD device, use the table below to calculate the required number of cylinders.

| Device | 4K-byte blocks per cylinder |
|--------|-----------------------------|
| 3380 | 150 |
| 3390 | 180 |

The numbers given in the following tables are the actual physical minimum space required. **No padding has been added.**

The minimum space recommended is the total of the materials you choose to load off the tape, plus a minimal margin for workspace and overhead:

- 1,000 4K blocks for the disk that holds system files
- 150 4K blocks for each of the other sections (samples, maps, SAS Support Tools) from which you install at least one item

Product Space Requirements Table

| Software Product | Installed (Complete) System Files | Complete Sample Libraries | Total (Complete System and Samples) |
|--|---|---------------------------------|--|
| Base SAS Software | 47,426 | 901 | 48,327 |
| SAS/ACCESS Interface to ORACLE Software | 90 | 70 | 160 |
| SAS/ACCESS Interface to PC File Formats Software | 20 | 0 | 20 |
| SAS/ACCESS Interface to DB2 Server for VM Software | 80 | 0 | 80 |
| SAS/ACCESS Interface to SYSTEM 2000 Software | 99 | 220 | 319 |
| SAS/AF Software | 111 | 0 | 111 |
| SAS/ASSIST Software | 3,947 | 0 | 3,947 |
| SAS/CONNECT Software | 366 | 83 | 449 |
| SAS/ETS Software | 5,074 | 207 | 5,281 |
| SAS/FSP Software | 168 | 0 | 168 |
| SAS/GIS Software | 6,605 | 78 | 6,683 |
| SAS/GRAPH Software | 6,244 | 780 | 7,024 |
| SAS/GRAPH Map Data Sets | 6,292 | 0 | 6,292 |
| SAS/IML Software | 1,138 | 262 | 1,400 |
| SAS/IntrNet Software (Experimental) | 335 | 297 | 632 |
| SAS/LAB Software | 1,565 | 0 | 1,565 |
| SAS/MDDDB Server Software | 654 | 0 | 654 |
| SAS/OR Software | 6,466 | 686 | 7,152 |
| SAS/QC Software | 1,689 | 1,308 | 2,997 |
| SAS/SHARE Software | 58 | 64 | 122 |
| SAS/STAT Software | 4,503 | 1,077 | 5,580 |

Map Data Set Space Requirements Table¹

| Category | Total |
|---|-------|
| Countries in Africa and Middle East Maps | 994 |
| Countries in Asia and Pacific Maps | 2,594 |
| Countries in Europe Maps | 3,014 |
| North America and Canada Maps | 1,260 |
| Countries in Latin America and Caribbean Maps | 1,600 |
| Canada Maps | 472 |
| Continents Maps | 6,426 |
| World Map | 6,401 |
| Very Large US County Map, Unprojected | 3,100 |
| Large US County Map, Unprojected and Reduced | 374 |
| Large US State Outline Map, Unprojected | 354 |
| Large US Mainland County Map, Projected and Reduced | 374 |

1. Maps are shipped to sites licensed for SAS/GRAPH Software.

| Category | Total |
|--------------------------------|-------|
| Installation Aids | 355 |
| SAS Support Tools ² | 1 |

2. SAS Support Tools disk requirements are subject to change on a regular basis.

SAS/GIS Census Tract Maps

| State | Required Disk Space in 4K Blocks |
|----------------------|-------------------------------------|
| Alabama | 3,024 |
| Alaska | 2,493 |
| Arizona | 940 |
| Arkansas | 2,735 |
| California | 4,248 |
| Colorado | 1,896 |
| Connecticut | 578 |
| Delaware | 186 |
| District of Columbia | 17 |
| Florida | 3,541 |
| Georgia | 3,638 |
| Hawaii | 380 |
| Idaho | 2,027 |
| Illinois | 3,108 |
| Indiana | 1,890 |
| Iowa | 1,918 |
| Kansas | 2,089 |
| Kentucky | 2,982 |
| Louisiana | 4,066 |
| Maine | 1,974 |
| Maryland | 1,008 |
| Massachusetts | 1,077 |
| Michigan | 3,016 |
| Minnesota | 4,153 |
| Mississippi | 2,238 |
| Missouri | 3,087 |

| State | Required Disk Space in 4K Blocks |
|------------------------------|-------------------------------------|
| Montana | 3,114 |
| Nebraska | 1,704 |
| Nevada | 777 |
| New Hampshire | 642 |
| New Jersey | 929 |
| New Mexico | 1,110 |
| New York | 3,409 |
| North Carolina | 3,677 |
| North Dakota | 2,285 |
| Ohio | 2,669 |
| Oklahoma | 2,242 |
| Oregon | 2,350 |
| Pennsylvania | 3,243 |
| Rhode Island | 193 |
| South Carolina | 2,283 |
| South Dakota | 2,028 |
| Tennessee | 3,329 |
| Texas | 6,640 |
| Utah | 1,240 |
| Vermont | 479 |
| Virginia | 2,872 |
| Washington | 2,363 |
| West Virginia | 1,613 |
| Wisconsin | 3,173 |
| Wyoming | 1,713 |
| Total for all entries | 114,394 |

Specific Product Requirements

SAS/ACCESS Interface to ORACLE Software

DBMS Products Required:

- Oracle, Version 7.3.3.6 or higher

SAS/ACCESS Interface to DB2 Server for VM Software

DBMS Products Required:

- DB2 Server for VM, Version 5.0 or higher

SAS/ACCESS Interface to SYSTEM 2000 Software

DBMS Products Required:

- SYSTEM 2000, Release 11.6 with Field Fix 1 or higher

SAS/CONNECT Software

APPC Access Method:

Using the APPC access method, you can do the following.

- Communicate with other CMS systems, you may need to have the Transparent Services Access Facility (TSAF) installed. TSAF provides inter-processor communication services for up to eight VM/ESA systems located within a single TSAF collection.
- Communicate with other systems outside of the TSAF collection that are connected by a SNA network, you must have Advanced Communication Facility/Virtual Telecommunications Access Method (ACF/VTAM, Release 3.2), Group Control System (GCS), and APPC/VM VTAM Support (AVS) installed.

TCP/IP Access Method:

With the TCP/IP access method, the following software is required:

- IBM CMS TCP/IP, Version 2, Release 3 or subsequent releases

SAS/GIS Software

Products Required:

- Base SAS software
- SAS/GIS software
- SAS/GRAPH software
- Other products may be required depending on the application

SAS/GRAPH Software

The Graphics Editor

Terminals:

- IBM 3192, 3179, 3472 graphics terminals
- Most 3270 emulation packages with host graphics should support the SAS/GRAPH graphics editor

SAS/IntrNet Software (Experimental)

SAS/IntrNet software consists of several components that may be installed independently. SAS/IntrNet Server software is installed on an existing SAS System and is included on the SAS System media. Other SAS/IntrNet software components may be installed from the Client-Side Components CD. See the **Space Requirements** section for the disk space requirements for these components.

CGI Tools and Applications

Application Dispatcher

Requires Base SAS software and SAS/IntrNet Server software. The Application Broker component of the Application Dispatcher must be installed on a Web server.

htmSQL

Requires Base SAS software, SAS/SHARE software, and a SAS/IntrNet software license (SETINIT). The htmSQL component must be installed on a Web server.

Xplore Sample Web Application

Requires Base SAS software and SAS/IntrNet Server software. The Application Dispatcher component must be installed and configured.

Java Tools and Applications

SAS/CONNECT Driver for Java

Requires Base SAS software, SAS/CONNECT software, and SAS/IntrNet Server software. SAS/SHARE software must also be installed if data services are used. The Java Tools package must be installed on a Web server or client system.

Tunnel Feature

Must be installed on a Web server running on a UNIX or Windows system.

MetaSpace Explorer Applet

Requires Base SAS software, SAS/CONNECT software, and SAS/IntrNet Server software.

SAS/LAB Software

Products Required:

- Base SAS Software
- SAS/FSP software (required for interactive data entry)
- SAS/GRAPH Software

SAS/MDDB Server Software

Memory:

The memory requirements for SAS/MDDB Server software are dependent upon the complexity of the hierarchies generated.

- 48 MB required
- 64 MB recommended

Large applications will see performance improvements with more available memory.

SAS OLAP Server Package

Products Required:

- Base SAS software
- SAS OLAP Server Package, which contains necessary elements of the following:
 - SAS/MDDB Server software
 - SAS/AF software
 - SAS/GRAPH software

Disk Space Required:

The disk space required for the SAS OLAP Server Package is the combined total space requirements for the SAS software products listed above. See the **Space Requirements** table for more information.

Note: If you have Release 8.2 of the SAS System already installed, then the amount of disk space required to install the SAS OLAP Server Package should be decreased by the disk space of any of the above products that have been previously installed.

SAS/SHARE Software

APPC Access Method:

With the APPC access method, the following software is required:

- VM/ESA

To communicate with other CMS systems, you may need to have the Transparent Services Access Facility (TSAF) installed. TSAF provides inter-processor communication services for up to eight VM/ESA systems located within a single TSAF collection.

To communicate with other systems outside of the TSAF collection that are connected by a SNA network, you must have Advanced Communication Facility/Virtual Telecommunications Access Method (ACF/VTAM, Release 3.2), Group Control System (GCS), and APPC/VM VTAM Support (AVS) installed.

TCP/IP Access Method:

With the TCP/IP access method, the following software is required:

- IBM CMS TCP/IP, Version 2, Release 3 or subsequent releases

Graphics Hardware and Software Compatibility

Terminals and Displays

SAS/GRAPH software supports standard IBM graphics terminals (such as IBM 3179G, IBM 3192G, and IBM 3472G).

SAS/GRAPH software should also be able to support most 3270 emulation packages as long as the 3270 emulation software is configured to provide host graphics support.

Printers

SAS/GRAPH software should be able to support almost any graphics printer on the market (provided that the graphics format that a printer supports is compatible with the graphics format written out by SAS/GRAPH device drivers). SAS/GRAPH software is compatible with most (if not all) printers that support HP-PCL, HP-GL, HP-GL/2, and PostScript languages. SAS/GRAPH software supports most printers from manufacturers such as Hewlett-Packard, Xerox, QMS, and Tektronix.

SAS/GRAPH software supports most IBM printers (such as the IBM 3800, IBM 3812, IBM 3816, IBM 3820, IBM 3900, and IBM 4224). SAS/GRAPH software support for some IBM printers (such as the IBM 3800 and 3900 printers) may require the GDDM base product. For more information on which printers require the GDDM base product, contact SAS Institute Technical Support. To view a complete list of all SAS/GRAPH device drivers, submit the following SAS program:

```
proc gdevice c=sashelp.devices nofs;
  list _all_;
run; quit;
```

The device driver list is sent to the SAS Output window (if running interactively) or to the *<filename>* LISTING file (if running non-interactively).

Plotters and Film Recorders

SAS/GRAPH software should be able to support most plotters and film recorders on the market today. SAS/GRAPH software supports all HP and HP-compatible plotters that support HP-GL and HP-GL/2 languages. SAS/GRAPH software should also be able to support most film recorders that support HP-GL, Scodl, and Lasergraphics languages. To view a complete list of all SAS/GRAPH device drivers, submit the following SAS program:

```
proc gdevice c=sashelp.devices nofs;
  list _all_;
run; quit;
```

The device driver list is sent to the SAS Output window (if running interactively) or to the *<filename>* LISTING file (if running non-interactively).

Protocol Converters

SAS/GRAPH supports the following 3287-type protocol converters:

- Agile
- Andrew Data Systems
- Avatar
- Axis
- Cablenet
- I-Data
- IDEX
- I/O Corporation
- IRMAprint and IRMAprint2
- ISI 87
- KMW 3287
- Local Data Interlynx 3287
- NetCommander

Use of most graphics printers with 3287-type protocol converters listed above requires special communications software (such as RSCS). Contact SAS Institute Technical Support for more information.

SAS/GRAPH supports the following 3270-type protocol converters:

- Commtext C-80
- Datastream
- IBM 7171
- KMW 3270-FS
- Local Data Datalynx
- Micom 7400
- PCI 1071, 1076
- Renex
- Hydra

Interfaces with other Graphics Software

Included with SAS/GRAPH software is a series of device drivers that can produce output in Computer Graphics Metafile (CGM) format. These files can be used to transfer SAS/GRAPH output to other products that can import CGM files, such as Harvard Graphics, Microsoft Word, and Microsoft PowerPoint.

SAS/GRAPH software also provides device drivers to create output in various other graphics file formats, such as HP-GL, PostScript, Encapsulated PostScript, GIF, JPEG, TIFF, and PDF format. To view a complete list of all SAS/GRAPH device drivers, submit the following SAS program:

```
proc gdevice c=sashelp.devices nofs;  
  list _all_;  
run; quit;
```

The device driver list is sent to the SAS Output window (if running interactively) or to the *<filename>* LISTING file (if running non-interactively).

The GIMPORT procedure, part of SAS/GRAPH software, can be used to convert CGM files produced by other applications to graphics entries in a SAS catalog. You can use this feature to display output from other applications using SAS/GRAPH device drivers.

Viewing HTML Pages Created with the ActiveX and Java Device Drivers

The ActiveX and Java device drivers allow you to create HTML pages from within the SAS System.

The HTML pages created with the ActiveX device driver can only be viewed on Windows operating systems with Internet Explorer, Version 5.

The HTML pages created with the Java device driver can only be viewed *with* the following Java-enabled Web browsers *on* the following operating systems:

| Java-enabled Web Browser | Operating System |
|--|--|
| Netscape Navigator, Version 4.08 or higher | AIX, HP-UX, Solaris, ABI for Intel Architecture, IRIX, Compaq Tru64 UNIX |
| Netscape Communicator, Version 4.04 for Warp 4 | OS/2 |
| Internet Explorer, Version 5 (with Java VM 5.0.0.3167 or higher) or Netscape Navigator, Version 4.07 | Windows, Windows NT, Windows NT Server |

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