INTERNATIONAL ATOMIC ENERGY AGENCY
UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION
INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS
I.C.T.P., P.O. BOX 586, 34100 TRIESTE, ITALY, CABLE: CENTRATOM TRIESTE

H4.SMR/585-7

FIRST INTERNATIONAL SCHOOL ON COMPUTER NETWORK ANALYSIS AND MANAGEMENT

(3 - 14 December 1990)

Virtual Machine
Remote Spooling Communications
Subsystem Networking

G. C. Bottaini

IBM Semea s.r.l.
Direz. Supporti Specialistici
EE-TT / U.R.
Pisa

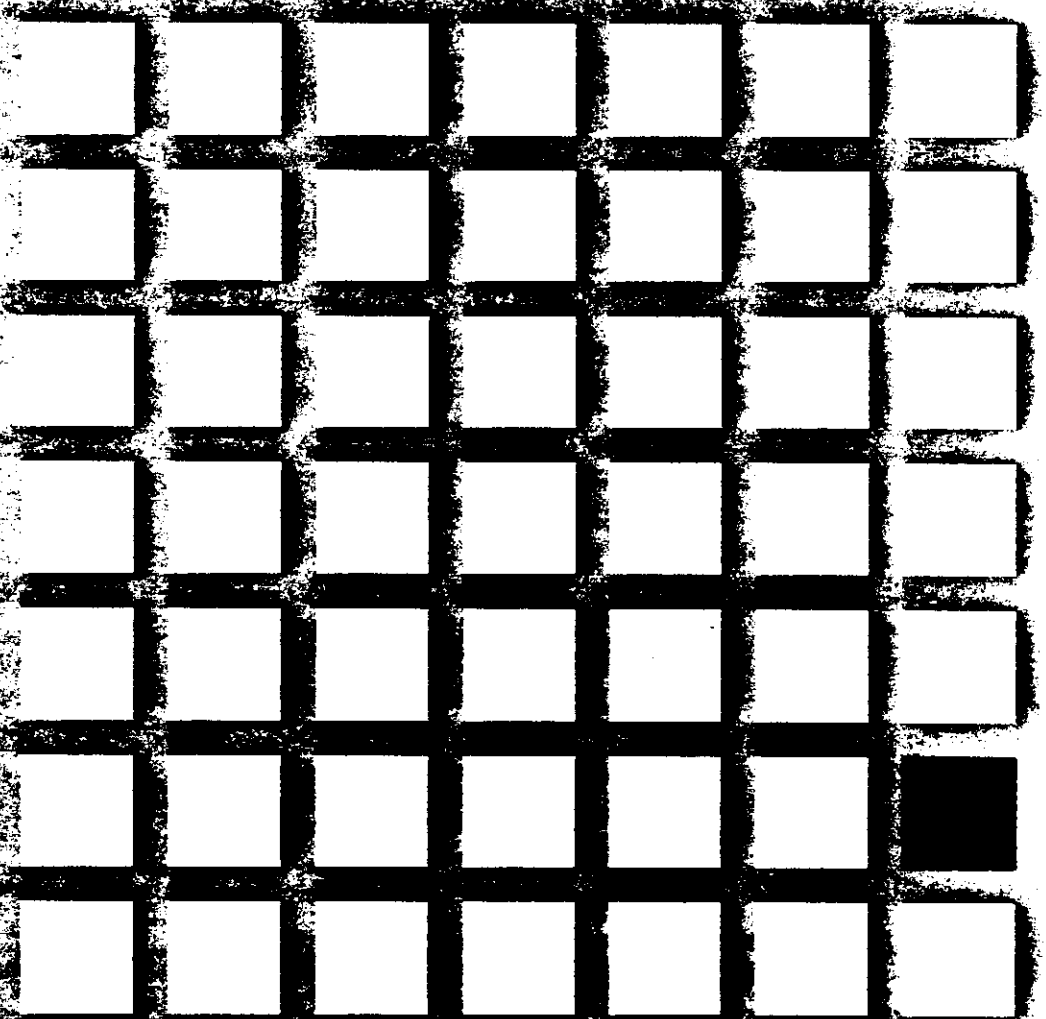
GH24-5055-03

IBM

Virtual Machine Remote Spooling Communications Subsystem Networking

General Information

Version 2
Release 3



GH24-5055-03

Virtual Machine Remote Spooling Communications Subsystem Networking

General Information

Version 2
Release 3

Fourth Edition (January 1988)

This edition, GH24-5055-03, is a major revision of GH24-5055-02, and applies to Release 3 of the Remote Spooling Communications Subsystem Networking Version 2 licensed program, program number 5664-188, and to all subsequent releases of this product until otherwise indicated in new editions or Technical Newsletters. Changes are made periodically to the information herein; before using this publication in connection with the operation of IBM systems, consult the latest *IBM System/370, 30xx, 4300, and 9370 Processors Bibliography*, GC20-0001, for the editions that are applicable and current.

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries which IBM operates. Any reference to an IBM licensed program in this publication is not intended to state or imply that only IBM's licensed program may be used. Any functionally equivalent program may be used instead.

Ordering Publications

Requests for IBM publications should be made to your IBM representative or to the IBM branch office serving your locality. Publications are *not* stocked at the address given below.

A form for reader's comments is provided at the back of this publication. If the form has been removed, comments may be addressed to IBM Corporation, Information Development, Department G60, P.O. Box 6, Endicott, NY, U.S.A. 13760. IBM may use or distribute whatever information you supply in any way that it believes appropriate without incurring any obligation to you.

Preface

This book contains a high-level description of the Remote Spooling Communications Subsystem Networking (RSCS) Version 2, Release 3 licensed program. It describes RSCS in sufficient detail to help new customers, RSCS customers migrating from an earlier version, and IBM representatives to determine if RSCS is suitable for their particular installations.

This book introduces basic RSCS and networking concepts. It is not intended to be used as a reference for programming or operating activities. This book assumes that the reader is familiar with a Virtual Machine (VM) operating system and its associated terminology.

Readers interested in the capabilities of RSCS in Systems Network Architecture (SNA) networks should become familiar with SNA concepts before reading this book. *SNA Concepts and Products* introduces these concepts.

Contents

Chapter 1. What RSCS Is

RSCS is the abbreviation for the program name **Remote Spooling Communications Subsystem Networking**, a VM[1] networking program. This name is descriptive. It describes what the program does. The words in the name, taken individually, mean:

Remote	A separate system or device that you access through a telecommunication line.
Spooling	Storing and retrieving data on an auxiliary direct access storage device (DASD) so that it is convenient for later processing or output.
Communications	Interaction or information (data) exchange with others.
Subsystem	A system that runs under the control of another system.
Networking	Data processing systems and devices connected with other systems and devices.

Taken together the words describe RSCS as:

> A system that runs under the control of another system. This system can store and retrieve data from auxiliary DASD devices and exchange data with others, including other systems, some distance away.

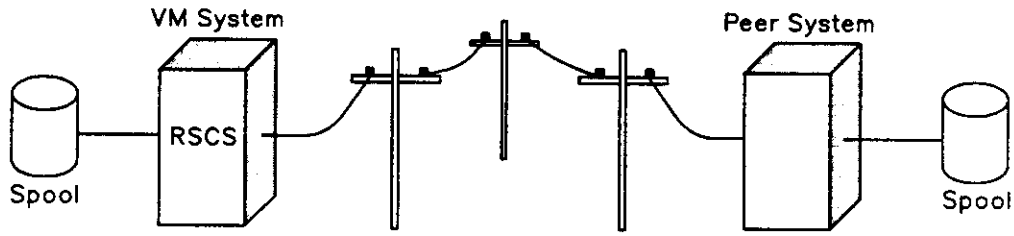


Figure 1. RSCS Transferring Spool Data Over Telecommunications Lines

RSCS runs under the Group Control System (GCS), a component of the VM operating system. RSCS uses the spooling facilities of VM to store and retrieve data. VM handles data transfer *within* its system by means of spooling. RSCS extends VM's spooling capabilities, handling data transfer *between* its VM system and outside sources.

Data is stored on a spool after RSCS gets it and until RSCS can forward it to its destination. RSCS uses communications equipment to transfer data from where it is, to where it needs to be—between the system (spool) and other systems or remote locations. To manage spooled files, RSCS relies on **tags**. Tags contain information that describes where the file came from and where it is going.

RSCS is a subsystem that can:

- Handle data being sent to, from, or through its VM system
- Store and retrieve input and output data files on the VM system spool

[1] VM refers to VM/SP Release 4 and above, VM/XA SP Release 2, or VM/SP HPO Release 4.2 and above.

- Use communications equipment to transfer data between its VM system and remote users, devices, and other systems.

What Networks Are

Networks consist of systems and Input/Output (I/O) devices connected by communications equipment. The connections between various points in a network are called **links**. The points at which links meet or end are called **nodes**. Figure 2 shows a simple network.

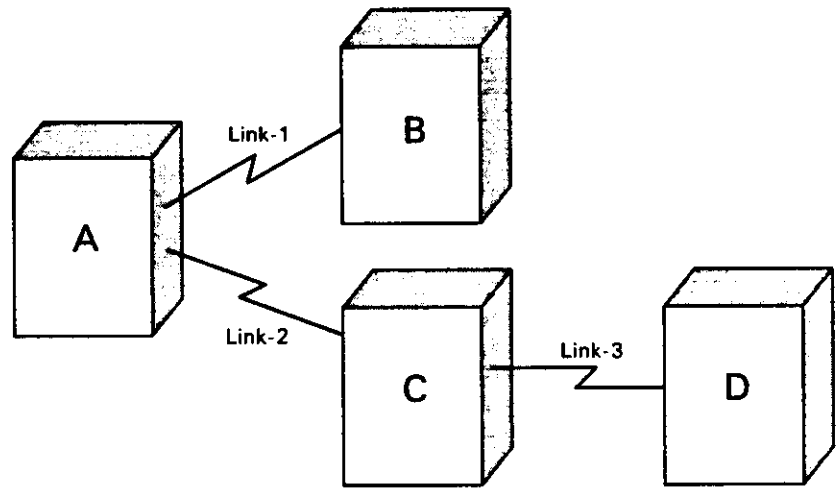


Figure 2. Nodes and Links in a Simple Network. Nodes A and B are adjacent and are directly connected by Link-1. Nodes A and D are not adjacent and are indirectly connected through node C over a path composed of the links Link-2 and Link-3.

What Nodes Are

Nodes in an RSCS network can be devices (like work stations and printers) or systems (both VM and non-VM peer systems[2]). In network terms, nodes are characterized as **local** or **remote**.

The term **local** means the system you are using at that particular time. Because RSCS runs on VM, its local node is a VM system. The term **remote** describes a connection to the system made through communications equipment over RSCS-defined links. Remote nodes are characterized as **adjacent** or **nonadjacent**.

An **adjacent** node is one that RSCS can communicate with directly. In other words, RSCS can transfer data to it without going through another node first. Just the opposite holds true for **nonadjacent** nodes. The communication is indirect because data passes from RSCS to an intermediate (adjacent) node, before the nonadjacent node receives it.

Figure 3 on page 3 shows the distinctions between remote and local and adjacent and nonadjacent nodes.

[2] A **peer** is an equivalent system, one with which data can be mutually exchanged.

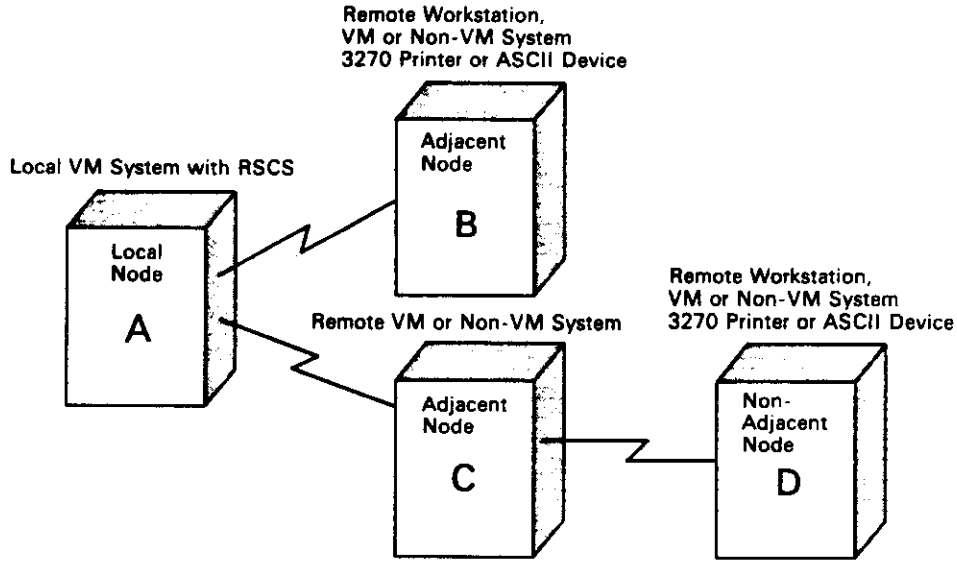


Figure 3. Node Characteristics in a Simple Network

What Links Are

A link is a connection between two adjacent nodes in a network. RSCS transfers data between its system and other nodes over links. Each link has a name that is the same as the name of the node at the other end of the link. Each link includes a programming routine, called a **driver**, that manages the transmission and reception of files, messages, and commands over the link. The way that a driver manages the data is called a **protocol**. The driver that is used for a particular link depends on the hardware and protocol that is used on the node at the other end of the link.

Data transmission on links follows certain rules or protocols. SNA (Systems Network Architecture) provides one set of protocols that governs communications on links. But, links can also use non-SNA protocols, like BSC (Binary Synchronous Communications) and CTC (Channel-to-Channel) communications. Because RSCS can transfer data across both SNA and non-SNA connections, networks may consist exclusively of SNA, non-SNA, or a combination of both types of links.

Differences Between SNA and non-SNA Links

RSCS has different methods of data transmission for SNA and non-SNA links. On non-SNA connections, RSCS determines where to move data and how to get it there. For SNA connections, RSCS deals with *where* and calls on another product, Advanced Communications Function for the Virtual Telecommunications Access Method (ACF/VTAM), to deal with *how*. Over non-SNA links, RSCS communicates directly with adjacent nodes and indirectly with nonadjacent nodes.

Indirect communication works like this: RSCS sends a file to an intermediate system (adjacent node). Upon receiving the file, the intermediate system stores it temporarily, then forwards the file either to its destination (the nonadjacent node) or to another intermediate system. This method of storing files, between the time they are sent and the time they are received, is called **store and forward** transmission. Figure 4 on page 4 shows a network that relies on store and forward transmission.

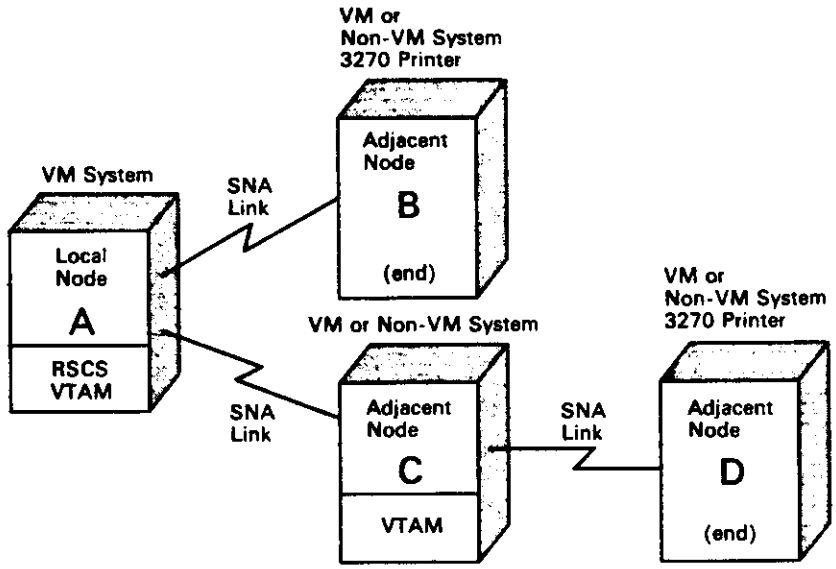


Figure 4. RSCS Communication Across Non-SNA Links in a Network. RSCS can communicate from **A** with either **B**, **C**, or **D**. It communicates with both **B** and **C** directly, but with **D** indirectly through **C**. That means a file from **A**, destined for **D**, would be stored on **C** first. Then, the networking program on **C** would forward the file to **D**.

RSCS communicates directly with both adjacent and nonadjacent nodes through VTAM by means of SNA links. On SNA connections, VTAM takes care of physically moving data between its origin and destination. To accomplish this, VTAM must have an accurate view of the network's physical configuration so that it can select paths for moving the data between nodes. RSCS, however, does not become involved with the physical movement of data on SNA links. While VTAM identifies the paths, RSCS simply identifies the destinations.

Because RSCS and VTAM divide the work involved with data transmission, they have different physical and logical views of nodes connected by SNA links. For instance, nodes that appear physically nonadjacent to VTAM seem adjacent to RSCS. Thus, with VTAM's help, RSCS carries on *direct* communications with nodes that are both physically adjacent and physically nonadjacent.

RSCS Configuration File

A **configuration file** tells RSCS about the network hardware and software arrangement. Statements in the configuration file describe (among other things):

- The name of RSCS's own VM system (local node)
- The names of links to adjacent nodes
- Communication paths (routes) to nonadjacent nodes through adjacent nodes
- How to communicate with the nodes (based on whether they are 3270 printers, work stations, peer systems or ASCII[3] devices).

[3] **ASCII** is an abbreviation for American National Standard Code for Information Interchange, and the term refers to both printer and plotter devices.

RSCS loads the configuration file during its initialization process. RSCS then builds internal tables based on information from the configuration file statements that governs operations at the network. RSCS's initial view of the network established by the configuration file, can be altered by means of RSCS commands which can add, delete, and redefine links between nodes while RSCS is still running.

Chapter 2. Types of Network Systems

RSCS can be used in either a single-system or a multi-system (network) environment. The configuration of a network depends both on the size and the nature of the business.

Single-system Environment

Typically, a small business operates in a single-system network. This network consists of a single, main computer that is centrally located and has a number of local and remote[4] devices connected to it.

In a single-system environment, RSCS running under VM can:

- Have output printed on a 3270[5] printer or ASCII device near them that several users share (regardless of input method or location)
- Send jobs or input by means of remote work stations from a remote location to the central computer for processing and receive processed output back.

3270 Printers

3270 printers are those printers that connect to the system by the same type of control unit as 3270 terminals. This group includes models that produce both alphanumeric and graphic (monochrome and color) output.

These printers range from basic function, low-cost models to more costly, extended function models. Basic function, low-cost 3270 printers help businesses provide their employees with timely printed output. Their basic function provides for day-to-day working copy. The low cost makes it feasible for a business to own several and distribute them among individual departments that are located *away* from the system, *near* users. Members in or near the department can share the printer and the benefits of having their output printed when and where it is convenient. The more costly, extended function 3270 printers provide for the special needs (graphics output, for example) of a business.

Sharing Printers

Scheduling and managing real devices is a necessary part of data processing. These are services VM gives to its users. VM controls real devices; users don't. Users do not have to wait for real devices to become available. They work as they need to, using virtual devices on their virtual machines.

Along with scheduling and managing real devices, the system provides for the more efficient shared use of those devices. They are not controlled by individual users, but by the system to work for everyone. Sharing is possible, under VM, because of spooling.

---

[4] Remote *devices* are those connected to the system by communications equipment. This type of connection allows for geographic separation between the system and the device. (They might be on different floors, in different buildings, or in different cities.) Remote *users* are those who access the system over remote connections.

[5] This in an abbreviation for the term 3270 Information Display System, which refers to a family of IBM input and output devices. For a list of these devices, see page 26.

When users "print" output on their virtual printers, for example, they are merely creating output files which the system stores on the spool. The spool, which has a large capacity for holding data, can hold output files from many different users for the same printer. When the required *real* printer is available, the system selects which file to print next. Only then does the spool file become printed on paper.

The system manages the flow of files to real printers. Users are concerned only with their virtual printers, which are always available to them. They can work continuously, run jobs that produce output at any rate, in any order. The system controls the real printers. It schedules the actual printing of an output file on a real 1403, 3800, 4245, or 4248 printer. In this way, many users can share a single real printer.

Sharing 3270 Printers

VM spooling does not support 3270 printers, RSCS does. Businesses that want the flexibility and convenience offered by 3270 printers can support them through RSCS.

RSCS supports both remote *and* local 3270 printers and manages them, just as VM does, through the system spool. RSCS extends VM's spooling capabilities to include 3270 printers.

The system controls other types of printers, but leaves control of 3270 printers to RSCS. Users direct their output for a 3270 printer to RSCS. When they "print" output, the system stores it in a spool file for RSCS. When the required real 3270 printer is available, RSCS selects which file to print next and sends it along to the printer. Only then does the spool file become printed on paper. Figure 5 shows several users sharing a single real (RSCS-controlled) 3270 printer.

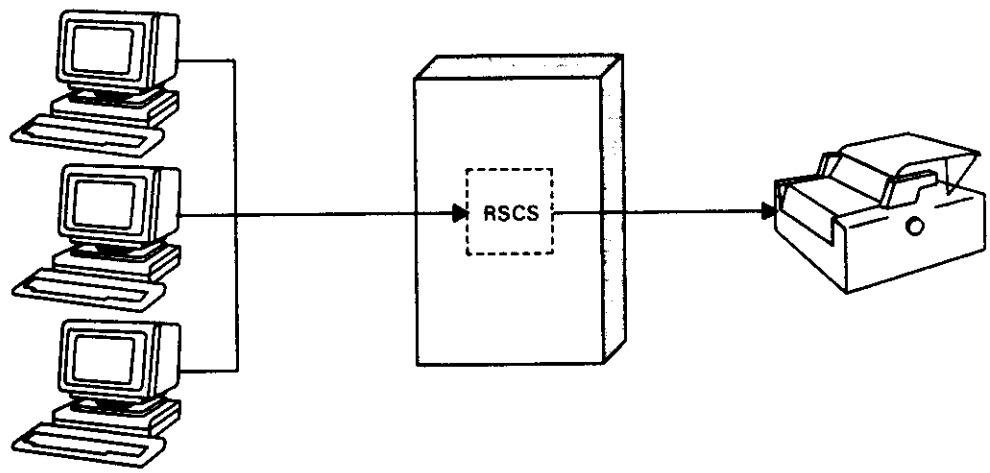


Figure 5. Through RSCS, Several Users Can Share a Single 3270 Printer

ASCII Devices

RSCS can communicate with ASCII devices connected to an IBM 7171 ASCII Device Attachment Control Unit or a 9370 ASCII Subsystem Controller in transparency mode. With these controllers and the RSCS support, user programs can transmit data streams of ASCII characters and control sequences rather than EBCDIC data streams to ASCII printers and plotters. RSCS uses the transparency mode of the controller to allow the users program to exercise the many features of an ASCII device such as type quality or type size which are not supported by the 3270 emulation provided by the controller.

Submitting Jobs from Remote Locations

Remote Work Stations

In RSCS terms, a remote work station consists of one or more devices through which users can send input to and receive output from a host[6] system. This process is called Remote Job Entry, and so, the remote work stations are often called RJE work stations.

Input and output are in the form of files. The files are created *before* they are sent to or from the remote work station. Input files can be jobs and data users have created or programs they have written. Output files can be formatted reports or results from compiling programs.

Using a remote work station, a user can send an input file to the host system for processing. The host creates an output file as the result of its processing and returns that file to the user. RSCS moves the data from the user to the system and from the system to the user through the remote work station.

Remote Work Station Location

A remote work station can be anywhere. It does not have to be near the system, but it can be situated, instead, near its users—where it is convenient for their work.

Remote work stations might be located right in individual users' offices. So, without leaving their work area users can:

- Create files (or use existing files)
- Send jobs to the system for processing
- Do other work at their desks while jobs are being processed
- Receive output when job processing is done
- Use results immediately for the next phase of their work.

Or, a remote work station might be centrally located, where it is convenient for several people to share—in the same building and on the same floor with its users.

Advantages of RSCS in a Single-system Environment

Greater efficiency, productivity, flexibility.

ASCII printer and plotter support allows users the advantage of using ASCII data streams rather than EBCDIC data streams. This allows users to take advantage of ASCII printer type size and quality which 3270 emulation does not support.

3270 printers complement rather than replace other (system-controlled) printers. They do work that other printers cannot do, allowing the other printers to be used more efficiently—for high-volume work and high-quality copy.

---

[6] In this discussion, **host** is the system used for processing jobs. It may be the same system to which a remote work station is physically connected. Or, in a multi-system network, the host may be another system in the network.

RSCS 3270 printer support means that:

- Users do not have to go after printouts or have them delivered from some other location. RSCS moves output data to a printer near users, so they can retrieve it as soon as it is printed.
- Neither the system nor individual users need to be involved with managing the shared use of a printer. RSCS can handle several users' output to a single device.

Remote work stations let employees use their company's computer to do their work even if they are geographically removed from it.

- Users do not have to carry (or have someone else carry) data to and from the computer. RSCS handles that—moving the data between users and the system. People stay where they are, where they work. Only the data moves.
- Users can work on the system whenever and as often as needed. Users can get results, make corrections, and try again in the same day. Or, they can get results and move on to the next task.

RSCS gives you the flexibility to align your resources according to the needs of your business. It lets you use devices more efficiently, which saves employees' time and energy for other activities. This means improved productivity in your employees and your business. Figure 6 shows RSCS supporting Remote Job Entry and users sharing an ASCII and a 3270 printer.

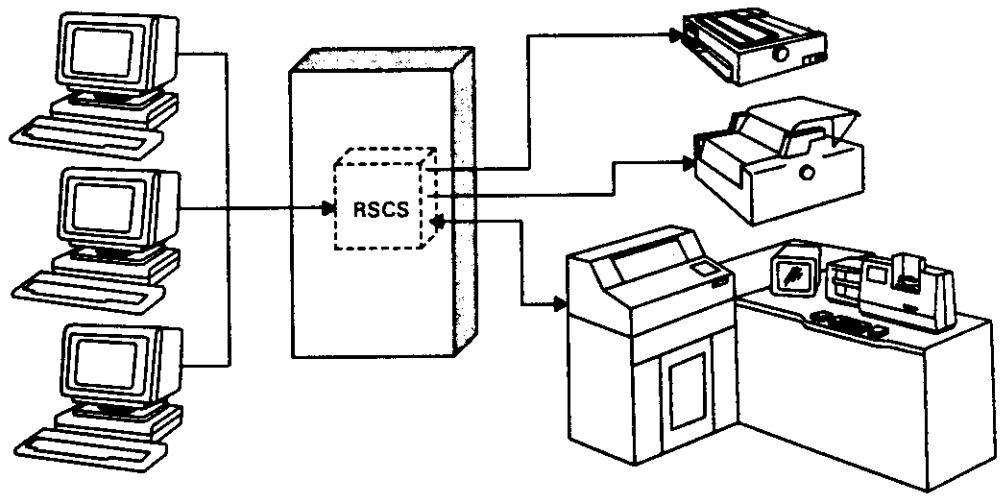


Figure 6. RSCS Support in a Single-system Network. RSCS supports remote job entry, users sharing a 3270 printer, and users sharing an ASCII printer.

Multi-system Environment

A multi-system environment expands the benefits of a single-system environment. Typically, a large business or one that has more than one geographic location operates in a multi-system network. This network consists of two or more systems connected to one another both physically and logically:

physically by communications equipment

logically in a defined relationship (as peer or host) to other systems.

The systems may be at the same[7] or at different geographic locations. Besides being connected to one another, each system in this network may have several local and remote devices connected to it.

In a multi-system network, because the systems are interconnected, data can be moved through and between them—from any system, to any system. RSCS running under VM (in addition to what it can do in a single-system environment) can do *networking*.

To users, networking means they can:

- Exchange data with users on the same system
- Exchange data with systems and users at other locations
- Send jobs to other systems for processing
- Direct processed output to devices--such as printers and punches—connected to another system.

Data Exchanges

Exchange simply means two-way communication. The *data* RSCS deals with falls into two categories—*messages* and *files*. Although messages are usually smaller pieces of data, the main distinction between the two is how RSCS handles them.

Messages are not spooled (stored temporarily); they are sent directly. If a message cannot be sent or its recipient is not there, the message is not delivered. (This is like calling someone on the telephone when the line is busy or there's no answer.) RSCS tells the sender when it cannot deliver the message. RSCS handles commands like messages.

Files are spooled, so they can always be delivered. If a file cannot be sent right away, it is held until it can be sent. When it arrives at its destination, it is placed in a user's virtual reader. So, it is delivered whether or not the recipient is there. (This is like sending someone a letter. It will be delivered in the mailbox even if no one is home.) If the file moves through other systems on route to its destination, RSCS tells the sender of its progress.

RSCS handles user exchanges and operational exchanges. The following text describes both, starting with the more frequent user exchanges.

User Exchanges

VM has the facilities to allow its users to exchange messages and files with other users on the *same* system. RSCS allows users to exchange data as easily with users on *other* systems and locations. RSCS moves data from one place to another in either direction—from system to system, user to user.

User exchanges can be business correspondence (electronic mail).

- Users can send data they've created to an associate at another regional office.
- Users can send weekly reports to a supervisor at a central location.

---

[7] To increase processing power, a business may choose to add a second processor at a site and connect it to their existing processor (rather than to replace their existing processor with one that has a larger processing capacity).

User exchanges can also be used for short reminders and notices (instead of telephone messages).

All of these exchanges can be done between users on different systems and at different locations.

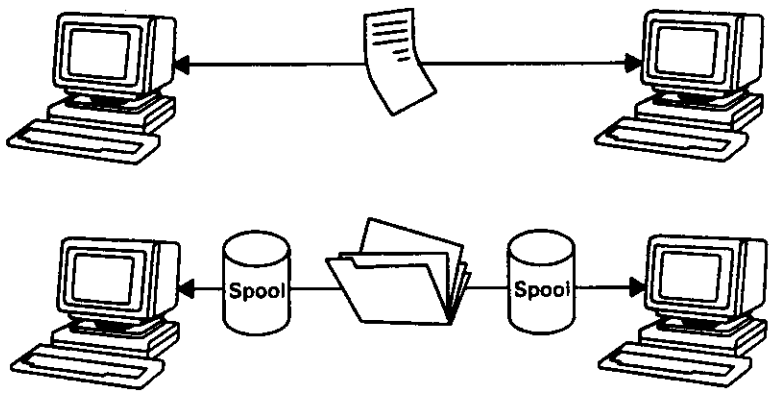


Figure 7. RSCS Allows Users on Different Systems to Exchange Messages and Files

Operational Exchanges

Operational exchanges deal with system operations.

VM provides the Programmable Operator Facility (PROP) which can be programmed to handle a number of routine system operations. Systems can run largely unattended. Sometimes they may need a person for special and manual operations, but they do not need the constant attention of a skilled operator.

RSCS adds the option of geographic separation between system and operator. Using PROP, a business can have an operator of one system oversee the operation of a second system at a remote location. RSCS sends information on special operations from the PROP on the remote system to the operator and sends the operator's responses back to the remote system. Using RSCS in this way, it is possible for one operator to oversee the operation of several systems, even in different cities or states.

Sending Jobs Other Places for Processing

Sending jobs other places for processing is like sending jobs from a remote work station, only broader in scope. Users can send jobs not only to their own system, but to and from other systems in the network. This makes resources available to users wherever they are in the network. They can take advantage of:

- A special configuration or piece of equipment connected to another system
- Programs or applications that are on other systems
- Greater processing capacity on another system
- Data from common data bases maintained on other systems.

RSCS puts users in touch with the resources they need by moving data to and from the selected resource. The resources of a business are available to more of its employees to help them do their jobs.

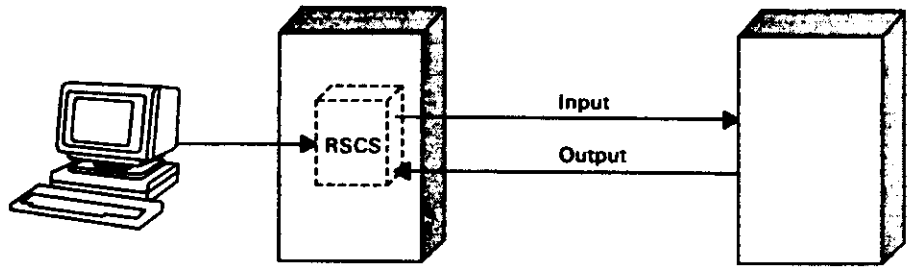


Figure 8. Users Can Send Jobs to Other Systems for Processing

Sending Output Other Places

The *other places* in this case are other systems (other than the one the user is logged onto) or a device connected to another system. The output may be destined for a printer, a punch, or another user.

When printed output is needed, a user can send the output to a user on another system for printing. That is, instead of printing the output and mailing it, it's mailed first (using RSCS) and printed at its destination.

Or, for another example, a specialized printer in a multi-system network may be connected to another system. RSCS can send the data to the specialized printer on the other system.

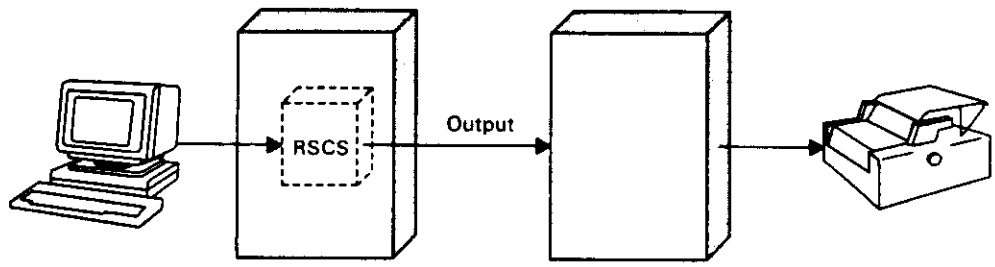


Figure 9. Users Can Send Output Files to Other Systems for Printing

Advantages of RSCS in a Multi-system Environment

Greater efficiency, productivity, flexibility.

Earlier, you learned the benefits RSCS offers in a single-system environment through its 3270 printer, remote work station, or ASCII support. Any system in the network with which RSCS can communicate can be used by your employees.

RSCS gives you many options in using your computing resources. Businesses can distribute computing systems, designed to the specific needs of a given department. Multi-system environments offer:

- Specialized device configuration
- Large processing capacity
- Special set of applications and programs.

Any of your employees can have access to the resources within your business network from their own location. However, you control their access to your resources at a corporate or site level.

Employees can get data they need from other systems. When a piece of work passes from one phase to another, moving as it does from department to department, RSCS can transfer data from one employee to the next, from one system to another system.

Employees can:

- Correspond electronically
- Use programs on another system to process their jobs
- Send jobs from a remote work station at their location to the local or to a remote system
- Direct output to RSCS-controlled 3270 printers or ASCII devices from jobs they have submitted to either local or remote systems
- Send or receive output for other system-controlled printers through RSCS
- Send an output file they have created for another employee to print on that employee's system.

You can buy and locate resources (processors, computer programs, I/O devices) to fit your business needs—by departments or regions. Because these resources can be shared, you can distribute the workload of your business and improve your employees access to these resources. This can lead to greater efficiency and productivity in your business.

Chapter 3. RSCS Meets Your Business Needs

You can use RSCS to move your data between your computer system and its users, wherever they are. If they are remote from the system, RSCS handles the movement of data between the system and remote resources. It also means that remote (like local) resources can be shared among several users for greater efficiency. RSCS gets the files for the system, then sends them on for processing—to its own VM system or to another system. When processing is done, RSCS, if requested, returns the results. RSCS can send output files to printers it controls, to system-controlled printers, or to other systems, as directed by users. What all of this means to you is flexibility—flexibility in the number and use of your resources.

Remember that the *data* RSCS deals with is mainly spool files. RSCS functions in moving data by:

1. Sending output data to printers it controls
2. Receiving input data from remote work stations to the system and sending output data from the system back to the work stations
3. Sending input and output data to other (peer) systems, and receiving input and output data from other systems.

These three functions, alone or combined, can meet a wide range of business needs and can be used on SNA and non-SNA connections in SNA, non-SNA, or mixed networks. With all of this, RSCS remains:

- Easy to install
- Easy to operate
- Easy to use.

Easy to Install

RSCS is easy to install because:

- It can be properly planned for.

  The RSCS *Planning and Installation* book, listed in the "Bibliography," contains information to help you adapt RSCS to your network configuration and business needs.

- The installation procedure is simple to perform.

  To install RSCS, your installer uses the same procedure used to install other VM feature licensed programs. The RSCS *Planning and Installation* book also describes how to do the necessary setup to run RSCS in your business environment.

- Choices for customizing the product are clearly defined.

  The RSCS *Exit Customization* book, listed in the "Bibliography," contains information to help you tailor RSCS to your business needs.

Networks using SNA will require a system programmer (or equivalent) to perform VTAM installation and configuration. VTAM support manuals (listed in the "Bibliography") describe these procedures.

Easy to Operate

RSCS is designed to run without regular operator intervention. Once initialized, its virtual machine can be disconnected so the operator is free to do other things. Even this task can be automated. A feature in VM lets virtual machines start automatically as part of the VM system initialization process.

Sometimes, the operator needs or wants to be involved with operations—to check status or make some changes (for performance or whatever reasons). For this, RSCS provides several useful commands. For example, to check the status of the files in the network, you just enter:

```
rscs query system links
```

To change the class of spool file 1002 from A to B, you just enter:

```
rscs change rmtvm 1002 class b
```

or to delete a link, you just enter:

```
rscs delete rmtvm
```

RSCS lets you authorize another user—an alternative operator—to do operational tasks. This can help you combine system and service machine operations at your site. It also lets you assign users at remote locations to control devices at their locations. This on-site control is not only more practical, but a more efficient way to manage remote operations.

The RSCS *Operation and Use* book describes RSCS operation tasks and procedures used in various environments.

Easy to Use

Many VM users *use* RSCS without even knowing it. Anytime they communicate or send files to users at other locations (using the CMS NOTE, TELL, or SENDFILE commands), they are *using* RSCS indirectly through VM.

Professional Office System (PROFS), program number 5664-309, is another such product. PROFS uses RSCS for its users to communicate with users at other locations.

Users can issue commands to RSCS directly to do these tasks if they wish. They are also given control over files they own while the files are still in transit. After sending files, users can issue commands to find where the files are on route and even to delete files. The RSCS *Operation and Use* book describes RSCS user tasks and procedures for various environments.

Some Other Features

RSCS includes mechanisms for problem recovery, both dynamic and operator-initiated. It also has diagnostic aids to help isolate problems with faulty data transmission equipment or procedures. Its accounting facilities for tracking data transfer are consistent with those used by VM.

Chapter 4. Why Customers Should Choose RSCS Version 2

For customers using RSCS Version 1, this section highlights what is new in Version 2. New customers can skip this section and continue reading at Chapter 5, "RSCS Requirements" on page 25.

The external function of RSCS 2.3 is consistent with RSCS Version 1 even though it has been internally restructured. It runs as part of a virtual machine group under GCS (VM's multitasking supervisor that supports applications and subsystems in multiple virtual machines). Instead of doing its own supervisory services, RSCS uses the services of GCS.

Enhancements

This section briefly explains the changes to RSCS in Version 2, Release 1.

Version 2, Release 1

SNA

Major RSCS functions were made available for use in SNA connections. RSCS can:

- Send files to and receive files from SNA systems (in sessions involving logical unit type 0)
- Send output files to 3270 printers (in sessions involving logical units type 0, 1 or 3).

  RSCS can also share these printers with VSCS (VTAM SNA Console Support) or other VTAM application programs.

VTAM runs as a GCS subsystem. As such, a part of VTAM resides in common storage where it can be shared by multiple virtual machine applications. RSCS is defined to VTAM as one of its applications. They are both defined to VM as part of the same virtual machine group.

Invocation

Because RSCS runs under GCS, it must be invoked from the GCS environment using the LOADCMD command. It must then be initiated with the new RSCS INIT command.

In networks where RSCS will use VTAM for sending data, it must start communications with VTAM using the new RSCS NETWORK START command.

Graphics Output

This support enabled RSCS to send monochrome and color graphics output spool files produced by GDDM (Graphical Data Display Manager) to graphics printers. These can be printers defined to:

- VM/SP, local and remote connections
- VTAM (SNA printers in sessions involving logical units type 0 and 1), local and remote connections.

Virtual Printer Output

Support for handling virtual printer output was extended. RSCS can send and get spooled files for 4245 and 4248 printers. This new support was consistent with its existing support for other FCB-type printers (3203, 3211, 3262). It can send spooled 4245/4248 output to:

- A 3270 printer (control commands removed)
- A remote work station (control commands removed for non-multi-leaving work stations)
- Another VM system in the network.

Event Tracing

The GCS command ITRACE can trace events occurring between the GCS supervisor and one of its virtual machines (RSCS, for example). The RSCS GTRACE command has additional data on events within its virtual machine, such as task initiations and terminations, module calls and returns, and exit calls.

Networking Enhancements

One new networking line driver replaced three existing line drivers for exchanging data with other VM and non-VM peer systems. The changes included improvements to quality and maintainability and refinements to the consistency of its communications protocol.

The networking line driver and its new counterpart for exchanging data with SNA systems use multistreaming to manage data traffic between systems. Multistreaming is a technique in which multiple data files can be sent or received concurrently. When small files are interspersed with portions of large ones using this technique, RSCS appears to move more data between systems faster in some networks.

Usability Enhancements

A REROUTE command was added to make RSCS more adaptable to changes in its operating environment. Installations can use the command to redirect RSCS delivery of messages and files whether they are sent from, passing through, or received at its system. The REROUTE command can be used to reroute messages and files when, for example:

- A user group (department) has been moved to a different system.
- The system that usually handles final printing is not operational (preventive service is being applied or new equipment is being installed).
- A user has taken over another's work responsibilities.
- A user is working on a system at another location temporarily.

The QUERY command was changed to make it easier for users to get information about their files that RSCS is handling. A file receives a spoolid (internal identification) for tracking at each system it passes through in route to its destination. To make any inquiry on RSCS Version 1, the user had to know the spoolid assigned at the latest system handling the file. Now, users can make inquiries using a single spoolid, the one assigned at their own (origin) system. And, they can request information on *all* their files on a given node with a single QUERY.

The CHANGE, PURGE, TRANSFER, and FLUSH commands are available for general users to issue against files they have sent that RSCS is handling.

Extended I/O Tracing

The RSCS TRACE command can be used to request a transaction log for SNA links. RSCS records data on SEND and RECEIVE transactions with VTAM.

Version 2, Release 2

This section briefly explains the changes to RSCS in Version 2, Release 2.

Networking Enhancements

Advanced Function Printing (AFP) Subsystem Support

RSCS 2.2 provided networking capability for AFP Subsystem Support included in VM/SP Release 5 and PSF/VM Release 1 (5664-198) for Advanced Function printers such as the IBM 3820 and 3800-3 printers. This allowed Advanced Function Printing Data Stream (AFPDS) files to be printed on and/or routed through either VM or non-VM (e.g., MVS) systems regardless of the system on which they were created. This support included:

- Transmitting and receiving AFPDS records which contain All-Points-Addressable print data.
- Transmitting and receiving Output Processing Sections in Data Set Headers.
- Specifying file destinations through the use of a DEST parameter in CP Spool commands.
- A new method for queueing networking links by file size. The number of spool blocks, instead of the number of records determines file size.
- Addition of a new parameter to the QUERY SYSTEM option of the RSCS QUERY command, DEST, which displays local identifiers.

RAS

In conjunction with VM/SP Release 5, RSCS support preserved the actual data length for certain records. This support also preserved the original sequence of Channel Command Words (CCWs) used to create a spool file. Since CP in VM/SP Release 5 no longer merges CCWs, RSCS optionally merges CCWs sent to work stations and automatically merges CCWs sent to 3270 printers. No merging is performed for networking links.

Automatic Link Management

RSCS, through Automatic Link Management, activates links to remote systems and devices thereby freeing the operator for other tasks.

- The auto-dial function automatically calls a remote work station or system when a link that is connected to a switched telecommunications line is activated. A user-specified phone number is automatically dialed when the link is activated.
- The auto-answer function automatically accepts incoming calls from a remote work station (or system) on a switched telecommunications line, and it activates the link requested by the remote system. If a port is inactive for an amount of time specified by the user, the session will be automatically terminated to free the port for other calls.
- The auto-start function automatically starts a previously defined inactive link and can be used on both switched and non-switched lines, 3270 printer links (both SNA and non-SNA) and SNA NJE links.

The following new commands were provided for the Auto-Link-Management function to control a pool of telecommunications adapter port addresses which monitor incoming phone calls.

DISABLE Deactivates a switched telecommunications port; incoming calls will not be received.

ENABLE Activates a switched telecommunications port which allows the port to receive incoming calls.

PORT Reserves a virtual address so that a Binary Synchronous Communication (BSC) telecommunication line can be dynamically allocated to it when a link is started without explicit port specification.

RSCS Exit Facility

Using the RSCS Exit Facility, you can invoke installation-written routines from strategic locations in RSCS without modification of any IBM code. These routines are invoked dynamically based on definition statements in the RSCS configuration file. There are 256 possible exit points (numbered 0 through 255). Each of the exit points supplied by RSCS 2.2 fall within one of the following classes:

- Initialization/Termination Exits
- Spool File Accounting Exits
- Auto-Answer Security Exits
- NJE Header and Trailer Exits.

A new command, EXIT, was added which enables or disables one or more specified user exits. Additionally, a new parameter to the QUERY SYSTEM option of the RSCS QUERY command requests information concerning which RSCS exits have exit routines loaded.

For more information, refer to the RSCS *Exit Customization* book.

VM/Interactive Productivity Facility (VM/IPF)

VM/IPF running under CMS provided a series of panels with which predefined users direct the operation of the local RSCS system. The panels were provided to assist users whose user IDs were defined as either system administrator, system operator, or general user.

VM/IPF provides support for the following RSCS functions:

- Definition, starting and stopping of RSCS SNA links
- Redirecting RSCS messages and files
- Auto-dial, auto-answer and auto-start options with all RSCS links (see Automatic Link Management above).

Performance Enhancements

All of the following enhancements increased central processing unit (CPU) availability.

Queue Reorder

RSCS no longer has to re-accept all of the spool files in its virtual reader to rebuild its file queues. Internal queue reordering is done automatically whenever a link is activated or deactivated and when a RSCS DEFINE, DELETE, REROUTE, ROUTE, or START command is issued.

Storage Allocation
Instead of issuing GETMAIN and FREEMAIN macros to obtain storage for each file that is transmitted or received, a pool of storage areas is retained and reused for file transfers.

Link and Route Table Search
In order to minimize table search time, the RSCS LINK and ROUTE tables are searched by means of a hashing algorithm, rather than a sequential search, except for very small table sizes.

Message Retrieval
The RSCS message handler now uses the message number as an index into its message table, rather than searching the table sequentially each time a message is to be issued.

Task Management
When RSCS is running on the level of GCS that is supplied with VM/SP Release 5, RSCS no longer alters the dispatching of RSCS subtasks by issuing CHAP macros. Instead, the GCS dispatcher halts a running task once a time limit is exceeded to start another task of equal priority.

Usability Enhancements

Several new parameters were added to the QUERY SYSTEM option of the RSCS QUERY command. These include:

LOCAL Displays information about the local system.
LEVEL Displays version and release information of the RSCS system.

New parameters were also added to enhance the CPQUERY command.

CPUID Displays the CPU id.
CPLEVEL Displays information concerning the level of the system software product.

Between Release Support

This section briefly explains the changes to RSCS between Version 2, Release 2 and Version 2, Release 3.

Network Usability Enhancements

Three network usability enhancements were made available to Version 2, Release 2 users via the service process. These enhancements are:

- List Processor Support
- Confirmation Message Support
- Default Routing Support.

These enhancements are described in "Operational/Usability Enhancements" on page 23.

Version 2, Release 3

This section briefly explains the changes to RSCS in Version 2, Release 3.

ASCII Printer/Plotter Device Support

RSCS can now communicate with ASCII devices connected to an IBM 7171 ASCII Device Attachment Control Unit or a 9370 ASCII subsystem controller in transparency mode. With these controllers and the RSCS support, user programs can send ASCII data streams rather than EBCDIC data streams to an attached device. RSCS uses the transparency mode of the controller to allow the user's program to exercise the many features of an ASCII printer or plotter, such as type quality or type size which are not supported by the 3270 emulation provided by the controllers.

This RSCS support provides the equivalent function of the RSCS line driver and exit routines supplied with the Host Loaded Yale ASCII Communications System program offering, 5798-RRJ. Several exit routines are provided as samples and support a variety of printers and plotters. These exit routines are dynamically loaded by RSCS and customize the RSCS ASCII line driver for a specific device. The routines have the capability to modify and translate the input spool data, or add appropriate ASCII control sequences based on the external characteristics of the spool file. An installation can customize the devices by modifying the sample routines and can support a new device by coding a new exit routine.

Print File Separator Page Support

RSCS 2.3 separator page support helps bring consistency to hard copy output regardless of the device driver. You can now use RSCS to drive a 3270 printer or work station with header and trailer pages very similar to those printed on CP-driven line printers. All fields on the CP header page will be printed on the RSCS header with some fields containing RSCS specific information rather than system information.

The existing short-style separator retains the level of support currently available on RSCS 3270 printer links but now also is available on all work station and printer link types. RSCS 2.3 also provides support to allow an installation to dynamically modify the line length, the page length, and the separator option depending on the form being processed on a link. The characteristics of a form are specified on a new configuration file statement, FORM. Additional customization support is provided to the installation through two exit points. One exit point is to inspect and modify the separator page parameters and the other is to create a separator page one line at a time in place of the IBM generated separator page. These exits expand the existing RSCS facility introduced in RSCS 2.2 and enhance an installation's ability to customize RSCS.

Double Byte Character Set (DBCS) Support

RSCS 2.3 provides three major enhancements to existing RSCS DBCS support. The enhancements are in the areas of support of field outlining, Shift-Out/Shift-In (SO/SI) Print Position option, and APL/DBCS co-existence. Field outlining is a way to highlight a field with an outline. It is mainly used to show data in tabular form or to identify where input fields are located.

The DBCS terminal printer supports two different implementations of SO/SI boundaries between Single Byte Character Set (SBCS) and DBCS fields depending on session type. This RSCS enhancement allows the end user to select whether or not a blank is desired between SBCS and DBCS fields regardless of the session type. This selection is made on a file by file basis by means of a new option on the RSCS TAG command.

RSCS now allows for the co-existence of both APL and DBCS translation within a single file. When APL/DBCS translation is selected, the SBCS portion of a file containing both SBCS and DBCS fields is translated to APL or TEXT characters.

National Language Support (NLS)

RSCS now provides national language support of RSCS messages, productivity panels, and help panels for both United States (US) and non-US RSCS customers. RSCS 2.3 has mixed case US English as the default language, provides translation for uppercase US English in the base product, and provides translation features for German, French, Spanish, and Japanese. (Only the books are translated into Japanese, not the messages issued by RSCS.)

RSCS is simultaneously enabled for up to two languages, a local language and a network language. The local language is the language chosen for a particular system during RSCS installation, and the network language is the language to which the particular system belongs. The RSCS support is flexible in that it provides the ability for these languages to be the same or different. For example, the installation may choose to have the RSCS messages, productivity panels, and help panels translated into Japanese for the local language and have the RSCS messages translated into Uppercase US English for the network language.

Help Panel Support

RSCS 2.3 provides help panels for RSCS commands and messages. In addition, summary panels that provide task-oriented paths to the RSCS command panels are provided. This allows users to determine the RSCS command for which they wish to see more information. These help panels are invoked through the CMS HELP command, therefore requiring the end user or RSCS operator to be logged on to a CMS user ID.

Performance Enhancements

RSCS 2.3 provides enhancements in the areas of reusing unit record devices and reducing GETMAIN/FREEMAIN storage requests. These enhancements improve performance during non-file transfer operations such as opening and closing of spool files, and processing of messages, commands, and other routing elements.

RSCS uses virtual devices to manage the reading and writing of spool files. RSCS 2.3 now reuses virtual devices previously defined rather than detaching the virtual device upon closing the spool file. This improves RSCS performance when opening and closing spool files.

RSCS uses the GETMAIN and FREEMAIN macros to obtain and free storage used in building a message, command, or routing element which is placed on a queue until RSCS can process the request. RSCS 2.3 reuses the storage that has been previously obtained. RSCS only issues the GETMAIN macro when additional storage is required. This improves RSCS performance when processing messages, commands, and other routing elements.

Operational/Usability Enhancements

RSCS 2.3 provides enhancements in the areas of list processing, suppression of RSCS file confirmation messages, default routing, default log trace, and exit points.

The list processor facility is used to process a spool file containing a list of destinations. This allows the spool file to be transmitted over a network to the destinations contained in the distribution list using the minimum number of copies of the file. The distribution list is represented in the initial records of the file, and

identifies the ultimate recipients of the file in the same manner in which a single recipient is currently identified by information in the tag.

RSCS users can now select the type of file confirmation messages (initial receipt by RSCS, confirmation of forwarding, confirmation of arrival) they receive. This eliminates the interruption of a user's terminal session by RSCS messages and reduces the volume of message traffic (which delays file traffic) that RSCS must handle. This option is on a file by file basis and can be specified both for files that are processed by the list processor facility or for files that are transmitted directly over a link. The user has the choice of receiving all confirmation messages, no confirmation messages, or only the confirmation of arrival message (which is the default).

The default routing support allows the RSCS routing table to contain generic entries. This simplifies administration of routing tables by removing the restriction of having to specify every node name. This support is extremely beneficial for customers who have distributed systems where all system administrator/programmer skills are at a remote site. The distributed systems can route everything to the remote host site where a complete RSCS routing table can be maintained.

The default localid support allows RSCS to determine its local node name from information supplied by CP if the RSCS LOCAL configuration file statement is omitted or defaulted. This provides automatic synchronization between the CP system identification and the RSCS local node name.

The ENABLE command has been enhanced to allow a specific location to be specified for the log output, so the output no longer has to go only to the system printer. The RSCS QUERY SYSTEM PORTS command can now be issued to see the trace status of all switched telecommunications ports.

The exit point enhancement adds exit points to allow an installation to filter or modify commands and messages received by and issued from RSCS. These exits expand the existing RSCS exit facility introduced in RSCS 2.2 and enhance an installation's ability to customize RSCS.

Migration and Coexistence

If you are a new user of RSCS, you need not concern yourself with migration. If you are migrating from Version 1, see the RSCS *Planning and Installation* book for details.

Chapter 5. RSCS Requirements

Products and Physical Resources

RSCS requires VM/SP (5664-167) Release 4 or later. This product can also operate with or without the VM/SP High Performance Option (HPO) (5664-173) Release 4.2 or later and VM/XA SP Release 2. For SNA connections, RSCS requires and uses ACF/VTAM Version 3 for VM/SP (5664-280) to communicate with SNA 3270 printers and systems.

VM/IPF support requires VM/IPF Release 2.1 (5664-318) or later.

RSCS communicates differently on non-SNA and SNA connections. Because of this, requirements for networks that include SNA connections and use VTAM are different from those that do not. Real storage requirements vary depending on whether your configuration includes VTAM or not. Configurations using VTAM require at least 2M.

Physical requirements and products are also different, as described in the following sections.

Non-SNA Connections

For non-SNA connections, RSCS handles its own communications. It has specific requirements for communicating to and with the programs and devices it supports.

3270 Printers

RSCS requires a 327X Control Unit or integrated adapter for sending output to its printers. It does not distinguish between local (channel-attached) and remote connections. VM handles this distinction. Connections to 3270 SNA printers should follow VM requirements.

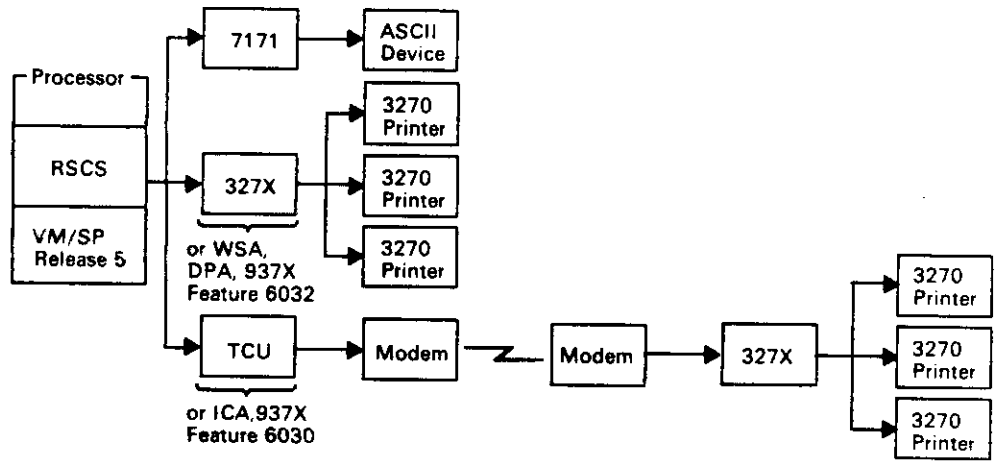


Figure 10. Requirements for Non-SNA Printer Support

The table below shows the printers supported by RSCS in a non-SNA environment.

Table 1. Non-SNA Printers Supported by RSCS

Alphanumeric Output	Graphics (GDDM) Output
Any 3270 printer: 3230-2 3262-3, 13 3268-2, 2C* 3284-1, 2 3286-1, 2 3287-1, 1C*, 2, 2C* 3288-2 3289-1, 2 3812-2 (w/feature 3190) 4214-1 4224-201, 202, 2C2, 2E2, FA2 4234-1 4245-D12, D20 5210-G01,G02[8] 5553** 5557**	3230-2 3268-2, 2C† 3287-1, 1C†, 2, 2C† 3812-2 (w/feature 3190) 4224-201,202,2C2,2E2,FA2

Notes:

*	Base color only
**	May be used for DBCS printing
†	Monochrome or color

Note: RSCS supports line lengths greater than 132 characters to printers with an extended line length option (3268-2C, for example).

ASCII Devices

It is possible to drive ASCII printers and plotters from RSCS. An IBM 7171 ASCII Device Attachment Control Unit can make an attached ASCII device appear as a 3270 printer to RSCS via emulation. The 7171 provides a means to allow a program to send ASCII data streams rather than 3270 (EBCDIC) data streams to an attached printer.

Remote Work Stations

RSCS requires a real or emulated[9] 2701 Transmission Control Unit (TCU) for communicating with remote work stations (half-duplex) to receive input and output.

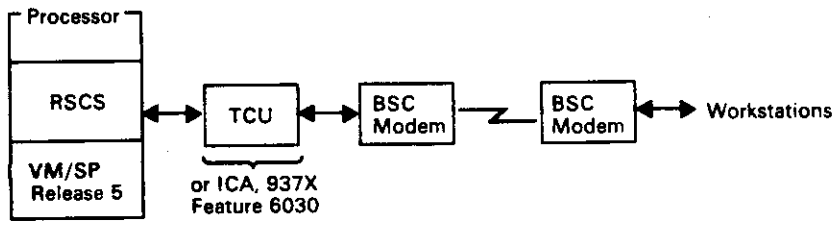


Figure 11. Requirements for Non-SNA Remote Work Station Support

[8] RSCS support of the 5210-G01 and 5210-G02 printers is equivalent to 3287-1 support.

[9] A 37XX, for example, can be generated with an emulator program (EP) for this function.

Table 2. BSC Devices Supported by RSCS	
Multi-Leaving Devices include	**Non-Multi-Leaving Devices include**
• System/370 Model 115 and above • System/360 Model 20 and above • System/38 • System/36 • System/34 • System/32 • System/3 Model 6 and above • 8100 • 5280 • Devices that emulate the above: 3777 (as a System/360 Model 20)	• 2770 Data Communication System with 2772 Multi-Purpose Control Unit • 2780-1, or 2 Data Transmission Terminal • 3780 Data Communications Terminal • Devices that emulate the above: 3770 (as a 2770) 6670

Networking

RSCS requires a real or emulated[10] 2701 Transmission Control Unit (half-duplex) for communicating with other systems.

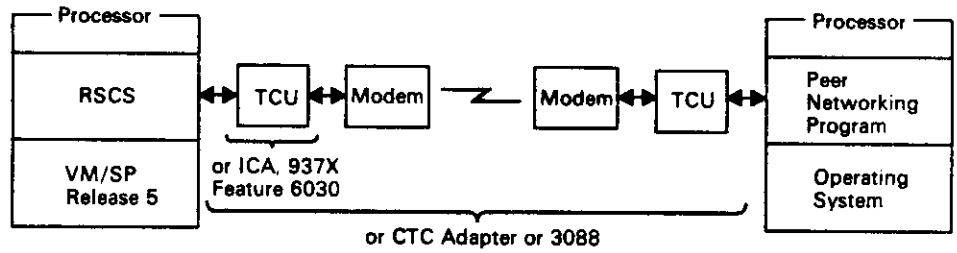


Figure 12. Requirements for Non-SNA Networking Support

For the table below, use Transmission Control Unit according to Peer Networking Program requirements.

Table 3. Programs Supported by RSCS in Non-SNA Networks	
Peer Networking Program	**Operating System**
RSCS Version 2	VM/SP, VM/SP HPO, or VM/XA SP2
RSCS Version 1, Release 3	VM/SP, VM/SP HPO, VM/XA Migration Aid, VM/XA System Facility, or VM/XA SP
JES2	MVS/SP or MVS/XA
JES3	MVS/SP or MVS/XA
VSE/POWER Version 2	DOS/VSE

SNA Connections

For SNA connections, RSCS requires and uses ACF/VTAM Version 3 for VM/SP (5664-280) to communicate with SNA 3270 printers and systems.

[10] A 37XX, for example, can be generated with an emulator program (EP) for this function.

3270 Printers

RSCS requires a 327X Control Unit or integrated adapter for sending output to its printers. It does not distinguish between local (channel-attached) and remote connections. VTAM handles this distinction; connections to 3270 SNA printers should follow VTAM requirements.

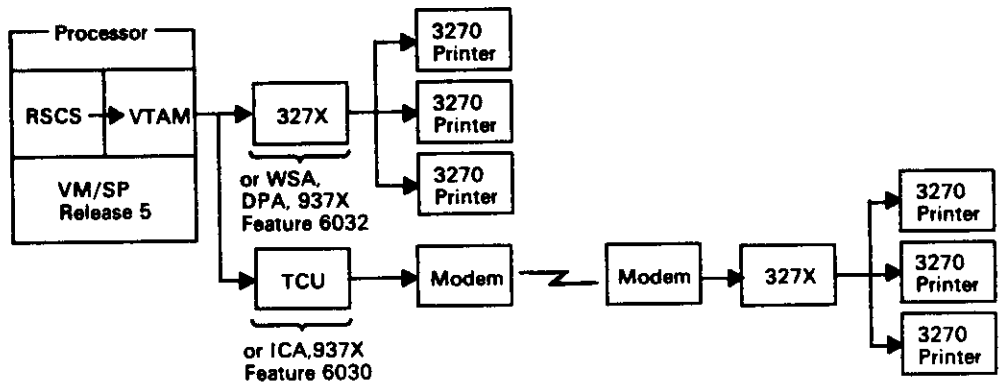


Figure 13. Requirements for SNA Printer Support

Table 4. Printers Supported by RSCS in an SNA Environment

Alphanumeric Output (Logical Unit Types 0, 1 and 3)	Alphanumeric Output (Logical Unit Types 0 and 3)	Graphics Output from GDDM (Logical Unit Types 0 and 3)	Graphics Output from GDDM (Logical Unit Types 0 and 1)
3230-2 3262-3, 13 3268-2, 2C* 3287-1, 1C* 2, 2C* 3289-1, 2 3812-2 (w/feature 3190) 4214-1 4224-201, 202, 2C2, 2E2, FA2 4234-1 4245-D12, D20 5210-G01, G02[11] 5553** 5557**	3284-1, 2 3286-1, 2 3288-2	3230-2 3268-2, 2C† 3287-1, 1C†, 2, 2C†	3812-2 (w/feature 3190) 4224-201, 202, 2C2, 2E2, FA2

Notes:

*	Base color only
**	May be used for DBCS printing
†	Monochrome or color

Note: RSCS supports line lengths greater than 132 characters to printers with an extended line length option (3268-2C, for example).

[11] RSCS support of the 5210-G01 and 5210-G02 printers is equivalent to 3287-1 support.

Networking

Communication connections to SNA systems should follow VTAM requirements. (Figure 14).

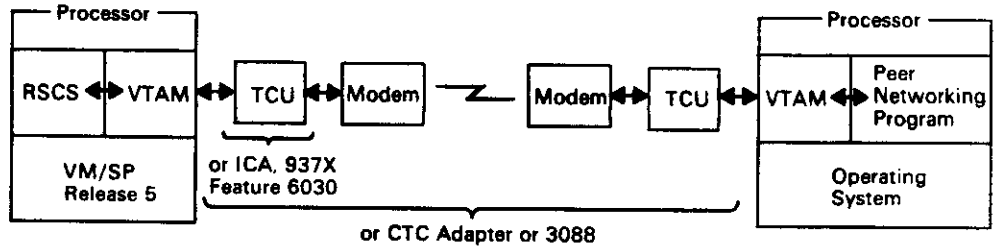


Figure 14. Requirements for SNA Networking Support

For the table below, use Transmission Control Unit according to Peer Networking Program requirements.

Table 5. Programs Supported in SNA Networks	
Peer Networking Programs	**Operating System**
Appropriate VTAM and RSCS Version 2	VM/SP, VM/SP HPO, or VM/XA SP Release 2
Guest operating system with appropriate VTAM and RSCS Version 1, Release 3 with RSCS Networking/SNA Program Offering, Release 2	VM/SP, VM/SP HPO, VM/XA MA, or VM/XA SF
Appropriate VTAM and JES2	MVS/SP or MVS/XA
Appropriate VTAM and VSE/POWER Version 2	DOS/VSE
Appropriate VTAM, JES3 and BDT Version 2	MVS/SP, MVS/XA

Customer Responsibilities

This section describes the tasks your personnel will have to do to support RSCS. These tasks fall into three categories—those done *one time* (initially), those that are *ongoing* (daily, weekly, monthly) and those that are *occasional* (as needed).

One-Time Tasks

These tasks are usually done by system programmers, support personnel, and administrators.

Planning

Consider designating someone to plan for installing RSCS on your system and making it operational. Planning will ensure a smoother process.

Installation

First, someone must install the product. This is done by a well-defined, step-by-step procedure. Then, the installer will apply the latest level of service to preclude unnecessary problems once RSCS is up and running.

Customization

Someone must create a definition (in a CMS file) of your network configuration. The definition describes the network's components, its characteristics, and other things that will govern the subsequent operation of RSCS.

Optionally, your installation can extend RSCS exit routines. You might use these extended routines to do tracking or accounting functions for data traffic on and through your system.

Operation and Administration

It is advisable to automate and simplify many aspects of RSCS operation and use. Much of this can be done through EXEC procedures. Someone must create such procedures, so they are there for use by RSCS, operators, and users.

Use the *Planning and Installation* and *Exit Customization* books as resources for these tasks.

Ongoing Tasks

These tasks are done by operators and users.

Operation

Operation includes both the operation of the RSCS system and the operation of its remote devices. You can and, for convenience, should assign remote (on-site) operators to control remote devices. As for RSCS, even though it is designed to run without regular operator intervention, there are tasks for an operator to do. If, for example, it is not practical for an installation to automate all or part of the initialization process, an operator will have to do this task. After initialization, the RSCS operator will have to monitor operations, make dynamic adjustments, and react to unusual situations. The Automatic Link Management function, however, reduces some of these responsibilities (see Automatic Link Management on page 19).

Use

VM/SP and other products use RSCS to handle communications between systems. With these and various automated procedures created by the installation, users need not even be aware they are using RSCS. Users can, of course, interact with RSCS directly to do these same functions and others—to send messages and files to other systems, check status or change any of their files in transit, and use remote work stations. VM/IPF can be used to control selected functions of a local RSCS system (see VM/IPF on page 20).

Use the *Operation and Use* book as a resource for these tasks.

Occasional Tasks

These tasks are usually done by support personnel.

Adjusting and Refining Customization

There will be occasional need for permanent adjustments due to long-term changes in the RSCS operating environment. Your network definition file, EXEC procedures associated with RSCS, or installation extensions to exit routines may need adjustments from time to time because of changes in:

- User population
- Network configuration
- Designated responsibilities
- Volume of data traffic.

Use the *Planning and Installation* book and the *Exit Customization* book as resources for this task.

Diagnosis

At times, there may be problems with errors on communications lines, slow response, or overloads. Someone will need to recognize symptoms and follow procedures for collecting data to find a solution or report the problem.

Use the *Diagnosis Reference* as a resource for this task.

Service

Sometimes it is necessary for someone to apply service to your system—either as a preventive measure or to fix a problem.

Use the *Planning and Installation* book as a resource for this task.

Glossary of Terms and Abbreviations

A

ACF/VTAM. Advanced Communications Function for Virtual Telecommunications Access Method Version 3 for VM/SP.

ACU. Automatic calling unit.

adjacent. In RSCS usage, two nodes are said to be adjacent if they are connected by only one link.

Advanced Communications Function for Virtual Telecommunications Access Method (ACF/VTAM). A licensed program that controls communications and flow of data in an SNA network. It provides single-domain, multiple-domain, and interconnected network capability. VTAM runs under MVS (OS/VS1 and OS/VS2), VSE, and VM/SP and supports direct control application programs and subprograms such as VSE/POWER.

advanced function printer (AFP). An all-points-addressable printer, such as the IBM 3800-3 and IBM 3820, that is capable of printing images as well as text.

advanced function printing data stream (AFPDS). A method of representing image data in a file that is destined for printing on a PSF-controlled printer.

AFP. Advanced function printer.

AFPDS. Advanced function printing data stream.

all points addressable (APA). The ability to refer to any pixel on the printable area of the screen. (Pixel is a dot that forms part of an image on the screen.)

alphanumeric. Pertaining to a character set that contains letters, digits, and usually other characters, such as punctuation marks; synonym for alphameric.

American National Standard Code for Information Interchange (ASCII). The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters.

APA. All points addressable.

apply. In reference to installation and service, to load down program temporary fix (PTF) files from the tape, reassemble or rename as needed, and produce runnable (executable) code. The PTF may have been loaded down in a previous step. If that is the case, apply means to reassemble or rename if needed and place the files on the correct staging disk for the build step to use, then produce the runnable code.

area. This term is acceptable for storage space when there is no need to differentiate between DASD space on count-key-data devices and FB-512 devices. See *DASD space.*

ASCII. American National Standard Code for Information Interchange.

automatic calling unit. A dialing device that permits a business machine to automatically dial calls over a network.

B

BDT. See *MVS/Bulk Data Transfer.*

binary synchronous communication (BSC). Communication using binary synchronous line discipline in which transmission of binary-coded data between stations is synchronized by timing signals generated at the sending and receiving stations.

BSC. Binary synchronous communication.

buffer. An area of storage, temporarily reserved for performing input or output, into which data is read, or from which data is written.

build. In reference to installation and service of a product, to perform the steps necessary to produce executable code or systems. This is often referred to as the build process.

byte. A unit of storage, consisting of eight adjacent binary digits that are operated upon as a unit and that constitute the smallest addressable unit in the system.

C

CCW. Channel command word.

central processing unit (CPU). The part of a computer that includes the circuits that control the interpretation and execution of instructions.

channel. A path in a system that connects a processor and main storage with I/O control units.

channel command word (CCW). A doubleword at the location in main storage specified by the channel address word. One or more CCWs make up the channel program that directs data channel operations.

channel-to-channel (CTC) device. A hardware device that connects two channels on the same computing system or on different systems. CTC devices include both channel-to-channel adapters (CTCAs) and 3088 Multi-system Communications Units (MCU).

CMS. Conversational monitor system.

command. A request from a user at a terminal for the execution of a particular CP, CMS, RSCS, or IPCS function.

common storage. A shared segment of reentrant code that contains free storage space, the GCS supervisor, control blocks, and data that all members of a virtual machine group share.

component. A collection of elements that together form a separate functional unit. A product may contain many components (VM/SP for example has components of CP, CMS, GCS, TSAF, IPCS, and AGW). A component can be part of many products (CP spans both the VM/SP and VM/HPO products).

concurrently. Concerning a mode of operation that includes doing work on two or more activities within a given (short) interval of time.

configuration file. A file that contains information on the arrangement of the network as defined by the nature, number, and the chief characteristics of its functional units.

connect. Establishing a path to communicate with another virtual machine or with the user's own virtual machine.

console. A device used for communications between the operator or maintenance engineer and the computer.

Control Program (CP). The component of Virtual Machine/System Product (VM/SP) that manages the resources of a single computer so that multiple computing systems appear to exist. Each virtual machine is the functional equivalent of an IBM System/370.

control unit. A device that controls I/O operations at one or more devices.

conversational monitor system (CMS). A virtual machine operating system that provides general interactive time sharing, problem solving, program development capabilities, and operates only under the control of the VM Control Program (CP).

CP. Control Program.

CPU. Central processing unit.

CTC. Channel-to-channel.

cylinder. In a disk pack, the set of all tracks with the same nominal distance from the axis about which the disk pack rotates.

D

DASD. Direct access storage device.

DASD space. (1) Area allocated to DASD units on count-key-data devices. (2) Area allocated to DASD units on FB-512 devices. Note that *DASD space* is synonymous with *cylinder* when there is no need to differentiate between count-key-data devices and FB-512 devices. This term applies to VM/370, as well as to the VM/SP and VM/SP High Performance Option program products.

data stream. A set of logical records sent one after the other.

DBCS. Double-byte character set.

DDP. Distributed data processing.

delimiter. (1) A flag that separates and organizes items of data. Synonymous with *separator*. (2) A character that groups or separates words or values in a line of input.

direct access storage device (DASD). A storage device in which the access time is effectively independent of the location of the data.

Disk Operating System/Virtual Storage Extended (DOS/VSE). An operating system that is an extension of Disk Operating System/Virtual Storage. A VSE system consists of: (a) licensed VSE/Advanced Functions support, and (b) any IBM-supplied and user-written programs required to meet the data processing needs of a user. VSE and the hardware it controls form a complete computing system.

dispatcher. The program in CP that places virtual machines or CP tasks into execution. The dispatcher selects the next virtual machine to run and prepares the virtual machine for problem state execution.

dispatching. The starting of virtual machine execution.

distributed data processing (DDP). Data processing in which processing, storage, and control functions, in addition to I/O operations, are distributed among remote locations and connected by transmission facilities.

DOS. Disk Operating System (DOS), in certain cases, is used as a generic term. For example, disk packs initialized for use with VSE or any predecessor DOS or DOS/VS system may be referred to as DOS disks.

DOS/VSE. Disk Operating System/Virtual Storage Extended.

double-byte character set (DBCS). A character set that requires 2 bytes to uniquely define each character. This contrasts with EBCDIC, in which each character to be printed is represented by 1 byte.

driver. A programming routine that manages the transmission and reception of files, messages, and commands over a link.

E

EBCDIC. Extended binary-coded decimal interchange code.

emulation. The use of programming techniques and special machine features to permit a computing system to execute programs written for another system.

emulation program (EP). A control program that lets an IBM 3704 or 3705 Communications Controller emulate the functions of an IBM 2701 Data Adapter Unit, an IBM 2702 Transmission Control Unit, or an IBM 2703 Transmission Control Unit.

EP. Emulation program.

exit. (1) to execute an instruction or statement within a portion of a program in order to terminate the execution of that portion. (2) An instruction in a program, routine, or subroutine that causes control to pass to another program, routine, or subroutine. (3) A routine, normally user-supplied, that received control from the system when a certain event such as an abnormal-end exit occurs.

exit program. A user-written program that is given control during operation of a system function.

extended binary-coded decimal interchange code (EBCDIC). A set of 256 characters, with each character represented by 8 bits.

F

facility. A service provided by an operating system for a particular purpose.

FCB. Forms control buffer.

filename. A one-to-eight character alphanumeric field, comprising of A through Z, 0 through 9, and special characters $ # @ + - (hyphen) : (colon) _ (underscore), that is part of the CMS file identifier and serves to identify the file for the user.

forms control buffer (FCB). In the 3800 Printing Subsystem, a buffer for controlling the vertical format of printed output. The FCB is analogous to the punched-paper, carriage-control tape used on IBM 1403 Printers.

free storage. Storage that is not allocated. The blocks of memory that are available for temporary use by programs or by the system.

G

GCS. Group Control System.

GDDM. Graphical Data Display Manager.

Graphical Data Display Manager (GDDM). (1) A group of routines that allows pictures to be defined and displayed procedurally through function routines that correspond to graphic primitives. Contrast with *presentation graphics routines*. (2) A licensed program that creates page segments.

group. Synonym for *virtual machine group*.

Group Control System (GCS). A component of VM/SP, consisting of a shared segment that the user can IPL and run in a virtual machine. It provides simulated MVS services and unique supervisor services to help support a native SNA network.

guest operating system. A second operating system that runs on the user's primary operating system. An example of a guest operating system is VSE running on VM/SP to support VCNA.

H

HELP. An online tool for supplying reference information on commands and messages for VM components.

host system. A data processing system that prepares programs and the operating environments for use by another computer or controller.

I

I/O. Input/Output.

interaction. A basic unit that records system activity, consisting of acceptance of a line of terminal input, processing of the line, and a response, if any.

interactive. The classification given to a virtual machine depending on this virtual machine's processing characteristics. When a virtual machine uses less than its allocation time slice because of terminal I/O, the virtual machine is classified as being interactive. See *noninteractive*.

Interactive Problem Control System (IPCS). A component of VM/SP, it provides a facility for diagnosing and reporting system failures and for managing problem information and status.

invoke. To start a command, procedure, or program.

IPCS. Interactive Problem Control System.

IPF. See Virtual Machine/Interactive Productivity Facility.

J

JES. Job Entry Subsystem.

JES2. A job entry subsystem for MVS.

JES3. A job entry subsystem for MVS.

Job Entry Subsystem (JES). A system facility for spooling, job queuing, and managing I/O. See also JES2, JES3.

L

line driver. An RSCS task (program) that permits communication between RSCS and a specific type of remote station.

link. (1) In RSCS, a connection, or ability to communicate, between two adjacent nodes in a network. (2) In TSAF, the physical connection between two systems.

local. (1) Two entities (for example, a user and a server) are said to be local to each other if they belong to the same system within a collection or to the same node within an SNA system. (2) In RSCS, channel-attached; that is, connected through only a channel, not through an RSCS-defined link. Local refers to a computer, I/O devices, and virtual machines that communicate with one another only over channels. Contrast with *remote*.

localid. In RSCS, the node id of the user's local system.

logical unit (LU). In SNA, a port through which an end user accesses the SNA network to communicate with another end user and through which the end user accesses the functions provided by system services control points (SSCPs). An LU can support at least two sessions, one with an SSCP and one with another LU, and may be capable of supporting many sessions with other logical units.

LU. Logical unit.

M

machine. A synonym for a virtual machine running under the control of VM/370 or VM/SP.

macro. In assembler language programming, an assembler language statement that causes the assembler to process a predefined set of statements called a macro definition. The statements usually produced from the macro definition replace the macro instruction in the program.

message. (1) In information theory, an ordered series of characters intended to convey information. (2) A group of characters and control bit sequences transferred as an entity. (3) A communication sent from a person or program to another person or program. (4) A unit of data sent over a telecommunication line. (5) For BSC devices, the data unit from the beginning of transmission to the first end of text (ETX) character, or between two ETX characters. (6) One or more message segments transmitted among terminals, application programs, and systems. (7) In SNA, deprecated term for message unit.

module. (1) A unit of a software product that is discretely and separately identifiable with respect to modifying, compiling, and merging with other units, or with respect to loading and execution. For example, the input to, or output from, a compiler, the assembler, the linkage editor, or an exec routine. (2) A nonrelocatable file whose external references have been resolved.

Multiple Virtual Storage (MVS). Multiple Virtual Storage, consisting of MVS/System Product Version 1 and the MVS/370 Data Facility Product operating on a System/370 processor.

multistreaming. Concurrent transmission of parts of several files so that small files are not held up waiting for transmission of large files.

multitasking. Providing services for many tasks that are active at the same time.

MVS. Multiple Virtual Storage.

MVS/Bulk Data Transfer (BDT). A licensed program that (1) copies sequential or partitioned data sets from a JES2 or JES3 computer complex to another JES2 or JES3 computer complex within an SNA network, and (2) lets JES3 computer complexes participate in an SNA NJE network.

N

network. Any set of two or more computers, work stations, or printers linked together in such a way as to permit data to be transmitted between them.

Network Job Entry (NJE). A facility for transmitting jobs, sysout data sets, operator commands and operator messages, and job accounting information from one computing system to another. NJE is supported by JES2, JES3, RSCS, VSE/POWER, and BDT.

NJE. Network job entry.

node. (1) A single processor or a group of processors in a teleprocessing network. (2) A computer, work station, or printer, when it is participating in a network.

noninteractive. The classification given to a virtual machine depending on this virtual machine's processing characteristics. When a virtual machine usually uses all its allocated time slice, it is classified as being noninteractive or compute bound. See *interactive*.

O

Operating System/Virtual Storage (OS/VS). A family of operating systems that control IBM System/360 and System/370 computing systems. OS/VS includes VS1, VS2, MVS/370, and VMS/XA.

OS/VS. Operating System/Virtual Storage.

OS/VS1. A virtual storage operating system that is an extension to OS/MFT.

OS/VS2. A virtual storage operating system that is an extension to OS/MVT.

P

page. A fixed-length block that has a virtual address and can be transferred between real storage and auxiliary storage.

parameter. A variable that is given a constant value for a specified application and that may denote the application.

peer system. From the perspective of a particular system node in a network, an equivalent system; one with which jobs and data can be mutually exchanged.

performance option. One or more functions that can be assigned to a virtual machine to improve its performance, response time (if terminal-oriented) or throughput under VM/SP.

preventive service. The process of loading the contents of a program update tape (PUT) to minidisks, and applying all changes. The last step of preventive service is to perform the build process. See *build*.

Print Services Facility/VM (PSF/VM). The access method that supports the 3800 Printing Subsystem Models 3 and 8. PSF can interface either directly to a user's application program or indirectly through the Job Entry System of MVS.

process. A systematic sequence of operations to produce a specified result. A process is usually logical, not physical.

product. Any separately installable software program, whether supplied by IBM or otherwise, distinct from others and recognizable by a unique identification code. Common examples of software products include:

5664-167 - Virtual Machine/System Product

5748-F03 - VS/FORTRAN Program Product

5748-RC1 - VM/Pass-Through Product.

The product identification code is unique to a given product, but does not identify the release level of that product.

Programmable Operator Facility (PROP). This facility enables automatic filtering and routing of messages from a specified virtual machine (for example the operator) to a logical operator virtual machine in a local distributed or mixed environment. The Programmable Operator Facility also permits installation defined actions to be automatically performed.

programmed symbols. A VM/SP feature that allows definition of user-indicated shapes or symbols.

protocol. (1) A set of rules for communication that are mutually understood and followed by two communicating stations or processes. The protocol specifies actions that can be taken by a station when it receives a transmission or detects an error condition. (2) In SNA, the meanings of the sequencing rules for requests and responses used for managing the network, transferring data, and synchronizing the states of network components.

Print Services Facility/VM (PSF/VM). A program (5664-198) that processes a CP printer spool file that is directed to an all-points-addressable printer, to create the (printer) commands to produce printed output.

PROP. Programmable Operator Facility.

PSF/VM. Print Services Facility/VM.

R

receive. Bringing into the specified buffer data sent to the user's virtual machine from another virtual machine or from the user's own virtual machine.

remote. (1) Two entities (for example, a user and a server) are said to be remote to each other if they belong to different systems within a collection, or to different nodes within an SNA network. (2) In RSCS, a connection through one or more RSCS-defined links. *Remote* describes computers, I/O devices, and virtual machines, to and from which information must pass over an RSCS-defined link. From the perspective of a particular node in an RSCS network, *remote* refers to any other node in the network. Contrast with *local*.

Remote Entry Services (RES). In OS/VS1, the set of functions added to the job entry subsystem that allows jobs and their associated data to be entered from remote devices, processed at the central system, and then transmitted back to remote devices.

Remote Job Entry (RJE). Submitting a job, and receiving output, through an I/O device that is connected to a computer via communications equipment.

Remote Spooling Communications Subsystem (RSCS). (1) A licensed program for VM, it is a special-purpose subsystem that supports the reception and transmission of messages, files, commands, and jobs over a computer network. (2) In this publication, it is synonymous with Remote Spooling Communications Subsystem Networking Version 2, which enhances the previous version of RSCS to support native SNA communications.

RES. Remote Entry Services.

resource. A program, a data file, a specific set of files, a device, or any other entity or a set of entities that the user might want to uniquely identify for application program processing in a VM system. A resource can be identified by up to eight characters.

RJE. Remote Job Entry.

route. A connection to another system via a logical link and many intermediate systems. In TSAF, a number of links and possible intermediate systems that allow the connection of one system to another.

routing table. A CMS file that contains the information that controls the operation of the programmable operator facility. It lets the programmable operator facility recognize a message as a command, determine the action to take when a message comes in, and recognize the authorized users of programmable operator functions.

RSCS. Remote Spooling Communications Subsystem.

S

separator. Synonymous with *delimiter*.

service machine. A virtual machine running a program that provides system-wide services.

session. A connection between two stations that lets them communicate.

session driver. An RSCS file management term which signifies the transfer of data on SNA links by entering into sessions with VTAM and transferring files through VTAM.

SNA. Systems Network Architecture.

software product. Any IBM or Original Equipment Manufacturer (OEM) supplied software or user written programs. The term includes program offerings and program products (PPs).

spool. (1) (Noun) An area of auxiliary storage defined to temporarily hold data during its transfer between peripheral equipment and the processor. (2) (Verb) To use auxiliary storage as a buffer storage to reduce processing delays when transferring data between peripheral equipment and the processing storage of a computer.

spool file class. A 1-character class associated with each virtual unit record device. For input spool files, the spool file class lets the user control which input spool files are read next; and, for output spool files, it lets the spooling operator better control or reorder the printing or punching of spool files having similar characteristics or priorities. The spool file class value can be A through Z, 0 through 9, or an asterisk (*).

spoolid. A spool file identification number that is automatically assigned by CP when the file is closed. The spoolid number can be from 0001 to 9900; it is unique for each spool file. To identify a given spool file, a user must specify the owner's user ID, the virtual device type, and the spoolid.

spooling. The processing of files created by or intended for virtual readers, punches, and printers. The spool files can be sent from one virtual device to another, from one virtual machine to another, and to real devices. See *virtual console spooling*.

store and forward. A manner of operating a data network in which messages are stored before transmission to the ultimate destination.

subsystem. A secondary or subordinate system, or programming support, usually capable of operating

independently of or asynchronously with a controlling system.

system administrator. The person responsible for maintaining a computer system.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through and controlling the configuration and operation of networks.

T

tag. One or more characters attached to a data file spooled to RSCS. Tags contain information about the file, including its identification, its origin, and its destination.

TCU. Transmission control unit.

telecommunication. The transmission of data between computer systems over telecommunications lines and between a computer system and remote devices.

terminal. A device, usually equipped with a keyboard and a display, capable of sending and receiving information over a communications channel. With VM/SP, the terminal communicates with the system.

terminal session. The period of time from logon to logoff when a user and the virtual machine can use the facilities of VM/SP or the operating system or both. This also includes any period of time that the virtual machine is running in disconnect mode. See *disconnect mode*.

transmission control unit (TCU). A communication control unit whose operations are controlled solely by programmed instructions from the computing system to which the unit is attached. No program is stored or executed in the unit. Contrast with communication controller. Synonymous with telecommunication control unit.

transparency mode. A binary synchronous communication (BSC) mode that permits transmission of any data, bypassing regular BSC control character scanning.

U

user. Anyone who requires the services of a computing system.

user ID. User identification. The name by which a virtual machine and its user are known to others.

V

virtual address. An address that refers to virtual storage or a virtual I/O device address, and that must, therefore, be translated into a real storage or I/O device address when it is used.

virtual console spooling. The writing of console I/O on disk as a printer spool file instead of, or in addition to, having it typed or displayed at the virtual machine console. The console data includes messages, responses, commands, and data from or to CP and the virtual machine operating system. The user can invoke or terminate console spooling at anytime and as often as the user likes. When the console spool file is closed, it becomes a printer spool file.

virtual machine. (1) A functional equivalent of a real machine. (2) A functional simulation of a computer and its associated devices. Each virtual machine is controlled by a suitable operating system. VM/370 controls concurrent execution of multiple virtual machines on a single System/370. (3) In VM, a functional equivalent of either a System/370 computing system or a System/370-Extended Architecture computing system. Each virtual machine is controlled by an operating system. VM controls concurrent execution of multiple virtual machines on a single system.

virtual machine group. The concept in the Group Control System of two or more virtual machines associated with each other through the same named system. Virtual machines in a group share common read/write storage and can communicate with one another through facilities provided by the Group Control System. Synonymous with *group*.

Virtual Machine/Interactive Productivity Facility (VM/IPF). An IBM-licensed program that contains a set of dialogs that let users complete tasks without issuing commands. The user supplies the data for the task by using display screens called panels. Panels allow the user to enter the data needed for that task. When all the information for the task is complete, VM/IPF issues the proper command, or commands, to perform that task.

Virtual Machine/System Product (VM/SP). A program product that manages the resources of a single computing system so that multiple computing systems (virtual machines) appear to exist. VM/SP consists of a Control Program (CP), which manages the real computer, and a Conversational Monitor System (CMS), which is a general-purpose conversational time-sharing system that executes in a virtual machine. Note that former VM/370 users continue to have a Remote Spooling Communications Subsystem (RSCS), which spools files to and from remote work stations, and the Interactive Problem Control System (IPCS),

which provides an online problem management, diagnosis, debugging, and tracking facility.

Virtual Machine/System Product High Performance Option (VM/SP HPO). An IBM-licensed program that can be installed and executed in conjunction with VM/SP to extend the capabilities of the VM/SP with programming enhancements, support for microcode assists, and additional functions. The VM/SP HPO program package requires installation of VM/SP.

virtual printer (or punch). A printer (or card punch) simulated on disk by CP for a virtual machine. The virtual device type and I/O address are usually defined in the VM/SP directory entry for that virtual machine.

virtual storage extended (VSE). The generalized term that indicates the combination of the DOS/VSE system control program and the VSE/Advanced Functions program product. Note that in certain cases, the term DOS is still used as a generic term; for example, disk packs initialized for use with VSE or any predecessor DOS or DOS/VS system are sometimes called DOS disks. Also note that the DOS-like simulation environment provided under the VM/SP CMS component and CMS/DOS exists on VM/SP and VM/SP High Performance Option program product and continues to be referred to as CMS/DOS.

Virtual Telecommunications Access Method (VTAM). A licensed program that controls communication and the flow of data in a computer network. It provides single-domain, multiple-domain, and multiple-network capability. VTAM runs under OS/VS1, MVS, VSE, and VM/SP. Synonymous with *ACF/VTAM* unless otherwise distinguished.

VM/IPF. Virtual Machine/Interactive Productivity Facility.

VM/SP. Virtual Machine/System Product.

VM/SP HPO. Virtual Machine/System Product High Performance Option.

VSCS. VTAM SNA Console Support.

VSE. Virtual storage extended.

VSE/POWER. Virtual Storage Extended/Priority Output Writers, Execution Processors, and Input Readers. An IBM-licensed program primarily used to spool input and output. The networking functions of the program enable a VSE/SP system to exchange files with or run jobs on another remote processor.

VTAM. Virtual Telecommunications Access Method.

W

work station. An I/O device from which jobs can be submitted to a host system for processing, or to which output can be returned, or both.

3262. Refers to the IBM 3262 Printer, Models 1 and 11.

3270. Refers to a series of display devices, namely the IBM 3275, 3276 Controller Display Station, and 3277, 3278, and 3279 Display Stations, and the 3290 Information Panel. A specific device type is used only when a distinction is required between device types. Information about display terminal usage also refers to the IBM 3138, 3148, and 3158 Display Consoles when used in display mode, unless otherwise noted.

3284. Refers to the IBM 3284 Printer. Information on the 3284 also pertains to the IBM 3286, 3287, 3288, and 3289 printers, unless otherwise noted.

3289. Refers to the IBM 3289 Model 4 Printer.

3800. Refers to the IBM 3800 Printing Subsystems, Models 1 and 3. A specific device type is used only when a distinction is required between device types.

4245. Refers to the IBM 4245 Line Printer.

4248. Refers to the IBM 4248 Printer.

9370. Refers to the IBM 9370 Processor.

Bibliography

Other Books in the RSCS Library

Virtual Machine Remote Spooling Communications Subsystem Networking:

Diagnosis Reference, LY24-5228
Exit Customization, LY24-5240
Licensed Program Specifications, GH24-5056
Messages and Codes, SH24-5196
Operation and Use, SH24-5058
Planning and Installation, SH24-5057
Reference Summary, SX24-5135

Other Books You May Need

ACF/VTAM Version 3 for VM/SP:

Network Program Products General Information, GC30-3350

VTAM Installation and Resource Definition, SC23-0111

JES2:

MVS/SP JES2 System Programming Library, GC23-0002

JES3:

MVS/SP JES3 Introduction, GC23-0039
MVS/SP JES3 Overview, SC23-0040

PSF/VM:

Advanced Function Printing Software: General Information, G544-3415

SNA:

Systems Network Architecture: Concepts and Products, GC30-3072

Telecommunications Terminology:

Dictionary of Computing, SC20-1699

IBM Virtual Machine/System Product:

Introduction, GC19-6200

VSE/POWER:

VSE/POWER General Information Manual, GH12-5128

VSE/POWER Reference Summary Remote Processing, SH12-5434

Printed in U.S.A.

VM RSCS Networking
General Information
Order No. GH24-5055-03

READER'S COMMENT FORM

Is there anything you especially like or dislike about this book? Feel free to comment on specific errors or omissions, accuracy, organization, or completeness of this book.

IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you, and all such information will be considered nonconfidential.

Note: Do not use this form to report system problems or to request copies of publications. Instead, contact your IBM representative or the IBM branch office serving you.

Would you like a reply? ___YES ___NO

Please print your name, company name, and address:

_____

_____

_____

_____

IBM Branch Office serving you: _____

Thank you for your cooperation. You can either mail this form directly to us or give this form to an IBM representative who will forward it to us.

GH24-5055-03

Reader's Comment Form

CUT OR FOLD ALONG LINE

Fold and tape | Please Do Not Staple | Fold and tape

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NY

POSTAGE WILL BE PAID BY ADDRESSEE:

IBM

INTERNATIONAL BUSINESS MACHINES CORPORATION
DEPARTMENT G60
PO BOX 6
ENDICOTT NY 13760-9987

Fold and tape | Please Do Not Staple | Fold and tape

IBM®

READER'S COMMENT FORM

Is there anything you especially like or dislike about this book? Feel free to comment on specific errors or omissions, accuracy, organization, or completeness of this book.

IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you, and all such information will be considered nonconfidential.

Note: Do not use this form to report system problems or to request copies of publications. Instead, contact your IBM representative or the IBM branch office serving you.

Would you like a reply? ___YES ___NO

Please print your name, company name, and address:

_____

_____

_____

_____

IBM Branch Office serving you: _____

Thank you for your cooperation. You can either mail this form directly to us or give this form to an IBM representative who will forward it to us.

GH24-5055-03

Reader's Comment Form

CUT OR FOLD ALONG LINE

Fold and tape | Please Do Not Staple | Fold and tape

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 40 ARMONK, NY

POSTAGE WILL BE PAID BY ADDRESSEE:

IBM

INTERNATIONAL BUSINESS MACHINES CORPORATION
DEPARTMENT G60
PO BOX 6
ENDICOTT NY 13760-9987

Fold and tape | Please Do Not Staple | Fold and tape

IBM