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This glossary includes terms defined in Systems Network Architecture; these are prefixed by "In SNA,". Also included are some terms used in this publication that are not specific to SNA. For definitions of terms not appearing in this glossary, see *IBM Data Processing Glossary,* GC20-1699.

Advanced Communications Function for the Network Control Program (ACF/NCP/VS). A program product that provides communication controller support for single-domain and multiple-domain data communication.

Advanced Communications Function for the Telecommunications Access Method (ACF/TCAM). A program product that provides single-domain data communications capability, and, optionally, multiple-domain capability.

Advanced Communications Function for the Virtual Telecommunications Access Method (ACF/VTAM). A program product that provides single-domain data communication capability and, optionally, multiple-domain capability.

Advanced Communications Function for VTAM Entry (ACF/VTAME). A program product that provides single-domain and multiple-domain data communication capability for an IBM 4331 that may include communication adapters.

basic information unit (BIU). In SNA, the unit of data and control information that is passed between half-sessions. It consists of a request/response header (RH) followed by a request/response unit (RU).

boundary function. In SNA, (1) a capability of a subarea node to provide protocol support for adjacent peripheral nodes, such as: (a) transforming network addresses to local addresses, and vice versa; (b) performing session sequence numbering for low-function peripheral nodes; and (c) providing session-level pacing support. See also *path control network, network addressable unit.* (2) The component that provides these capabilities.

boundary node. A subarea node with boundary function.

Note: A subarea node may be a boundary node, an intermediate routing node, both, or neither, depending on how it is used in the network.

class of service. In SNA, a designation of the path control network characteristics, such as path security, transmission priority, and bandwidth, that apply to a particular session. The end user designates class of service at session initiation by using a symbolic name that is mapped into a list of virtual routes, any one of which can be selected for the session to provide the requested level of service.

cluster controller node. A peripheral node that can control a variety of devices.

communication adapter. An optional hardware feature, available on certain processors, that permits communication lines to be attached to the processors.

communication controller node. A subarea node containing no system services control point (SSCP).

compaction. In SNA, the transformation of data by packing two characters in a byte so as to take advantage of the fact that only a subset of the allowable 256 characters is used; the most frequently sent characters are compacted.

compression. In SNA, the replacement of a string of up to 64 repeated characters by an encoded control byte to reduce the length of the data stream sent to the LU-LU session partner. The encoded control byte is followed by the character that was repeated (unless that character is the prime compression character, typically the space character).

configuration services. In SNA, one of the types of network services in the system services control point (SSCP) and in the physical unit (PU); configuration services activate, deactivate, and maintain the status of physical units, links, and link stations. Configuration services also shut down and restart network elements and modify path-control routing tables and address-transformation tables.

cross-domain. In SNA, pertaining to control or resources involving more than one domain.

cryptography. The transformation of data to conceal its meaning.

data flow control (DFC). In SNA, a request/response unit (RU) category used for requests and responses exchanged between the data flow control layer in one half-session and the data flow control layer in the session partner.

data flow control (DFC) layer. In SNA, the layer within a half-session that (1) controls whether the half-session can send, receive, or concurrently send and receive request units (RUs); (2) groups related RUs into RU chains; (3) delimits transactions via the bracket protocol; (4) controls the interlocking of requests and responses in accordance with control modes specified at session activation; (5) generates sequence numbers; and (6) correlates requests and responses.

data link control (DLC) layer. In SNA, the layer that consists of the link stations that schedule data transfer over a link between two nodes and perform error control for the link. Examples of data link control are SDLC for serial-by-bit link connection and data link control for the System/370 channel.

distributed data processing. Data processing in which some or all of the processing, storage, and control functions, in addition to input/output functions, are situated in different places and connected by transmission facilities. Contrast with *remote access data processing.*

domain. In SNA, a system services control point (SSCP) and the physical units (PUs), logical units (LUs), links, and associated resources that the SSCP has the ability to control by means of activation requests and deactivation requests. See also *shared control.*

element address. In SNA, a value in the element address field of the network address identifying a specific resource within a subarea. See also *subarea address.*

end user. In SNA, the ultimate source or destination of application data flowing through an SNA network. An end user may be an application program or a terminal operator.

explicit route (ER). In SNA, the path control network components, including a specific set of one or more transmission groups, that connect two subarea nodes. An explicit route is identified by an origin subarea address, a destination subarea address, an explicit route number, and a reverse explicit route number. See also *path, route extension, (REX), virtual route.*

flow control. In SNA, the process of managing the rate at which data traffic passes between components of the network. The purpose of flow control is to optimize the rate of flow of message units, with minimum congestion in the network; that is, to neither overflow the buffers at the receiver or at intermediate nodes, nor leave the receiver waiting for more message units. See also *pacing, session-level pacing, virtual route (VR) pacing.*

FMD services layer. In SNA, the layer within a requests and responses to particular NAU services manager components and that provides session network services or session presentation services, depending on the type of session.

function management (FM) header. In SNA, one or more headers, optionally present in the leading request units (RUs) of an RU chain, that allow one half-session in an LU-LU session to: (1) select a destination at the session partner and control the way that the end-user data it sends is handled at the destination, (2) change the destination or the characteristics of the data during the session, and (3) transmit between session partners status or user information about the destination (for example, a program or device).

half-session. In SNA, a component that provides FMD services, data flow control, and transmission control for one of the sessions of a network addressable unit (NAU).

host node. A subarea node that contains a system services control point (SSCP); for example, a System/370 computer with OS/VS2 and ACF/TCAM.

intermediate routing function. In SNA, a path control capability within a subarea intermediate function. A path control capability within a subarea node that receives and routes path information units (PIUs) that neither originate in nor are destined for network addressable units (NAUs) in that subarea node.

intermediate routing node. A subarea node with intermediate routing function.

Note: A subarea node may be a boundary node, an intermediate routing node, both, or neither, depending on how it is used in the network.

layer. In SNA, a grouping of related functions that are logically separate from the functions in other layers; the implementation of the functions in one layer can be changed without affecting functions in other layers. See also *NAU services manager layer, FMD services layer, data flow control layer, transmission control layer, path control layer, data link control layer.*

link. In SNA, the combination of the link connection and the link stations joining network nodes; for example: (1) a System/370 channel and its associated protocols, (2) a serial-by-bit connection under the control of synchronous data link control (SDLC).

Note: A link connection is the physical medium of transmission; for example, a telephone wire or a microwave beam. A link includes the physical medium of transmission, the protocol, and associated communication devices and programming; it is both logical and physical.

link connection. In SNA, the physical equipment providing two-way communication between one link station and one or more other link stations; for example, a communication line and data circuit terminating equipment (DCE).

link station. In SNA, the combination of hardware and software that allows a node to attach to and provide control for a link.

local address. In SNA, an address used in a peripheral node in place of a network address and transformed to or from a network address by the boundary function in a subarea node.

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

LU. Logical unit.

LU-LU session. In SNA, a session between two logical units in an SNA network. It provides communication between two end users, or between an end user and an LU services component.

maintenance services. In SNA, one of the types of network services in system services control points (SSCPs) and physical units (PUs). Maintenance services provide facilities for testing links and nodes and for collecting and recording error information. See also *configuration services, management services, network services, session services.*

management services. In SNA, one of the types of network services in system services control points (SSCPs) and logical units (LUs). Management services forward requests for network data, such as error statistics, and deliver the data in reply. See also *configuration services, maintenance services, network services, session services.*

message unit. In SNA, a generic term for the unit of data processed by any layer; for example, a basic information unit (BIU), a path information unit (PIU), a request/response unit (RU).

multiple-domain network. A network with more than one system services control point (SSCP). Contrast with *single-domain network.*

Multisystem Networking Facility. An optional feature of ACF/TCAM and ACF/VTAM that permits these access methods, together with ACF/NCP/VS, to control a multiple-domain network.

NAU. Network addressable unit.

NAU services manager layer. In SNA, the layer that: (1) controls network operations via LU-LU, SSCP-LU, SSCP-PU, and SSCP-SSCP sessions and (2) coordinates end-user interactions on LU-LU sessions. See also *configuration services, session services, maintenance services, management services.*

network address. In SNA, an address, consisting of subarea and element fields, that identifies a link, a link station, or a network addressable unit. Subarea nodes use network addresses; peripheral nodes use local addresses. The boundary function in the subarea node to which a peripheral node is attached transforms local addresses to network addresses and vice versa. See also *network name.*

network addressable unit (NAU). In SNA, a logical unit, a physical unit, or a system services control point. It is the origin or the destination of information transmitted by the path control network. See also *network name, network address, path control (PC) network.*

Note: Each NAU has a network address that represents it to the path control network. (LUs may have multiple addresses for parallel LU-LU sessions.) The path control network and the NAUs together constitute the SNA network.

network name. In SNA, the symbolic identifier by which end users refer to a network addressable unit (NAU), a link station, or a link.

network operator. In SNA, a person or program responsible for controlling the operation of all or part of a network.

network services (NS). In SNA, the services within network addressable units (NAUs) that control network operation via SSCP-SSCP, SSCP-PU, and SSCP-LU sessions.

node. In SNA, an endpoint of a link or a junction common to two or more links in a network. Nodes can be distributed or host processors, communication controllers, cluster controllers, or terminals. Nodes can vary in routing and other functional capabilities. See also *node type, peripheral node, subarea node.*

pacing. In SNA, a technique by which a receiving component controls the rate of transmission of a sending component to prevent overrun or congestion. See also *flow control, session-level pacing, virtual route (VR) pacing.*

parallel links. In SNA, two or more links between adjacent subarea nodes.

parallel sessions. In SNA, two or more concurrently active sessions between the same two logical units (LUs) using different pairs of network addresses. Each session can have independent session parameters.

path. In SNA, the series of path control network components (path control and data link control) that are traversed by the information exchanged between two network addressable units (NAUs). A path consists of a virtual route and its route extension, if any. See also *explicit route.*

path control layer. In SNA, the layer that manages the sharing of link resources of the SNA network and routes basic information units (BIU) through it. Path control routes message units between network addressable units (NAU) in the network and provides the paths between them. It converts the BIUs from transmission control (possibly segmenting them) into path information units (PIU) and exchanges basic transmission units (BTUs)—one or more PIUs—with data link control.

path control (PC) network. In SNA, the part of the SNA network that includes the data link control and path control layers. See also *boundary function, SNA network, user-application network.*

path information unit (PIU). In SNA, a message unit consisting of a transmission header (TH) alone, or of a TH followed by a basic information unit (BIU).

PC. Path control.

peripheral link. In SNA, a link that connects a peripheral node to a subarea node. See also *route extension (REX).*

peripheral LU. In SNA, a logical unit in a peripheral node.

peripheral node. In SNA, a node that uses local addresses for routing and therefore is not affected by changes in network addresses. A peripheral node requires boundary function assistance from an adjacent subarea node.

peripheral PU. In SNA, a physical unit in a peripheral node.

physical unit (PU). In SNA, the component that manages and monitors the resources (such as attached links and adjacent link stations) of a node, as requested by an SSCP via an SSCP-PU session. Each node of an SNA network contains a physical unit. See also *peripheral PU, physical unit type, subarea PU.*

Note: An SSCP activates a session with the physical unit in order to indirectly manage, through the PU, resources of the node such as attached links and adjacent link stations.

physical unit control point (PUCP). In SNA, a component that provides a subset of system services control point (SSCP) functions for activating the physical unit (PU) within its node and its local link resources. Each peripheral node and each subarea node without an SSCP contains a PUCP.

protocol. In SNA, the meanings of, and the sequencing rules for, requests and responses used for managing the network, transferring data, and synchronizing the states of network components.

PU. Physical unit.

public network. A network established and operated by communication common carriers or telecommunication Administrations for the specific purpose of providing circuit-switched, packet-switched, and leased-circuit services to the public. Contrast with *user-application network.*

remote access data processing. Data processing in which certain portions of the input/output functions are situated in different places and connected by transmission facilities. Contrast with *distributed data processing.*

request. In SNA, a message unit that signals completion of a particular action or protocol. For example, INITIATE SELF is a request for activation of an LU-LU session.

request header (RH). In SNA, a request unit (RU) header preceding a request unit.

request unit (RU). In SNA, a message unit that contains control information such as a request code or FM header, end-user data, or both.

request/response header (RH). In SNA, control information, preceding a request/response unit (RU), that specifies the type of RU (request unit or response unit) and contains control information associated with that RU.

request/response unit (RU). In SNA, a generic term for a request unit or a response unit.

response. (1) In SNA, a message unit that acknowledges receipt of a request; a response consists of a response header (RH), a response unit (RU), or both. (2) In SDLC, the control information (in the C-field of the link header) sent from the secondary station to the primary station.

response header (RH). In SNA, a header, optionally followed by a response unit (RU), that indicates whether the response is positive or negative and that may contain a pacing response.

response unit (RU). In SNA, a message unit that acknowledges a request unit; it may contain prefix information received in a request unit. If positive, the response unit may contain additional information (such as session parameters in response to BIND SESSION), or if negative, contains sense data defining the exception condition.

RH. Request/response header.

route. See explicit route, virtual route.

route extension (REX). In SNA, the path control network components, including a peripheral link, that comprise the portion of a path between a subarea node and a network addressable unit (NAU) in an adjacent peripheral node.

routing. The function of forwarding a message unit along a particular path through a network as determined by parameters carried in the message unit, such as the destination network address in a transmission header.

RU. Request/response unit.

SDLC. Synchronous Data Link Control.

session. In SNA, a logical connection between two network addressable units (NAUs) that can be activated, tailored to provide various protocols, and deactivated, as requested. The session activation request and response can determine options relating to such things as the rate and concurrency of data exchange, the control of contention and error recovery, and the characteristics of the data stream. Sessions compete for network resources such as the links within the path control network. See *half-session, LU-LU session, SSCP-LU session, SSCP-PU session, SSCP-SSCP session.*

Note: For routing purposes, each session is identified by the network (or local) addresses of the session partners.

session activation. In SNA, the process of exchanging a session activation request and a (positive) response between network addressable units (NAUs). Contrast with *session deactivation.*

session deactivation. In SNA, the process of exchanging a session-deactivation request response between network addressable units (NAU). Contrast with *session activation.*

session-level pacing. In SNA, a flow-control technique that permits a receiving half-session to control the data transfer rate (the rate at which it receives request units) on the normal flow. It is used to prevent overloading a receiver with unprocessed requests when the sender can generate requests faster that the receiver can process them. See also *pacing, virtual-route (VR) pacing.*

session limit. In SNA, the maximum number of concurrently active LU-LU sessions a particular logical unit (LU) can support.

session network services. In SNA, network services that are performed on a half-session by half-session basis, rather than for the network addressable unit (NAU) as a whole.

session partner. In SNA, one of the two network addressable units having an active session.

session presentation services. In SNA, a component of the FMD services layer that provides, within LU-LU sessions, services for the application programmer or terminal operator such as formatting data to be displayed or printed.

session services. In SNA, one of the types of network services in the system services control point (SSCP) and in a logical unit (LU). These services provide facilities for a logical unit (LU) or network operator to request that the SSCP initiate or terminate sessions between logical units. See also *configuration services, maintenance services, management services.*

shared control. In SNA, sequential or concurrent control of network resources—physical units (PUs), logical units (LUs), links, link stations and their associated resources—by two or more control points.

share limit. In SNA, the maximum number of control points that can concurrently control a network resource.

single-domain network. In SNA, a network with one system services control point (SSCP). Contrast with *multiple-domain network.*

SNA network. In SNA, the part of a user-application network that conforms to the formats and protocols of Systems Network Architecture. It enables reliable transfer of data among end users and provides protocols for controlling the resources of various network configurations. The SNA network consists of network addressable units, boundary function components, and the path control network.

SNA node. In SNA, a node that supports SNA protocols.

SSCP. System services control point.

SSCP-LU session. In SNA, a session between a system services control point (SSCP) and a logical unit (LU). The session enables the LU to request the SSCP to help initiate LU-LU sessions.

SSCP-PU session. In SNA, a session between a system services control point (SSCP) and a physical unit (PU); SSCP-PU sessions allow SSCPs to send requests to and receive status information from individual nodes in order to control the network configuration.

SSCP-SSCP session. In SNA, a session between the system services control point (SSCP) in one domain and the SSCP in another domain. An SSCP-SSCP session is used to initiate and terminate cross-domain LU-LU sessions.

subarea. In SNA, a portion of the SNA network consisting of a subarea node, any attached peripheral nodes, and their associated resources. Within a subarea node, all network addressable units, links, and adjacent link stations (in attached peripheral or subarea nodes) that are addressable within the subarea share a common subarea address and have distinct element addresses.

subarea address. In SNA, a value in the subarea field of the network address that identifies a particular subarea. See also *element address.*

subarea LU. In SNA, a logical unit in a subarea node.

subarea node. In SNA, a node that uses network addresses for routing and whose routing tables are therefore affected by changes in the configuration of the network. Subarea nodes can provide boundary function support for peripheral nodes. See also *peripheral node.*

subarea PU. In SNA, a physical unit in a subarea node.

Synchronous Data Link Control (SDLC). In SNA, a discipline for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. SDLC conforms to subsets of the Advanced Data Communication Control Procedures (ADCCP) of the American National Standards Institute and High-level Data Link Control (HDLC) of the International Standards Organization.

system services control point (SSCP). A focal point within an SNA network for managing the configuration, coordinating network operator and problem determination requests, and providing directory support and other session services for end users of the network. Multiple SSCPs, cooperating as peers with one another, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units and logical units within its own domain. See also *Physical unit control point (PUCP).*

Systems Network Architecture (SNA). In 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.

Note: The purpose of the layered structure of SNA is to allow the ultimate origins and destinations of information—that is, the end users—to be independent of, and unaffected by, the way in which the specific SNA network services and facilities used for information exchange are provided.

TC. Transmission control.

terminal node. A peripheral node that is not user-programmable, having less processing capability than a cluster controller node. Examples are the IBM 3277 Display Station, 3767 Consumer Transaction Facility, 3614 Communications Terminal, and 3624 Consumer Transaction Facility.

TH. Transmission header.

transmission control (TC) layer. In SNA, the layer within a half-session that synchronizes and paces session-level data traffic, checks session sequence numbers of requests, and enciphers and deciphers end-user data. Transmission control has two components: the connection point manager and session control.

transmission group. In SNA, a group of links between adjacent subarea nodes, appearing as a single logical link for routing of messages.

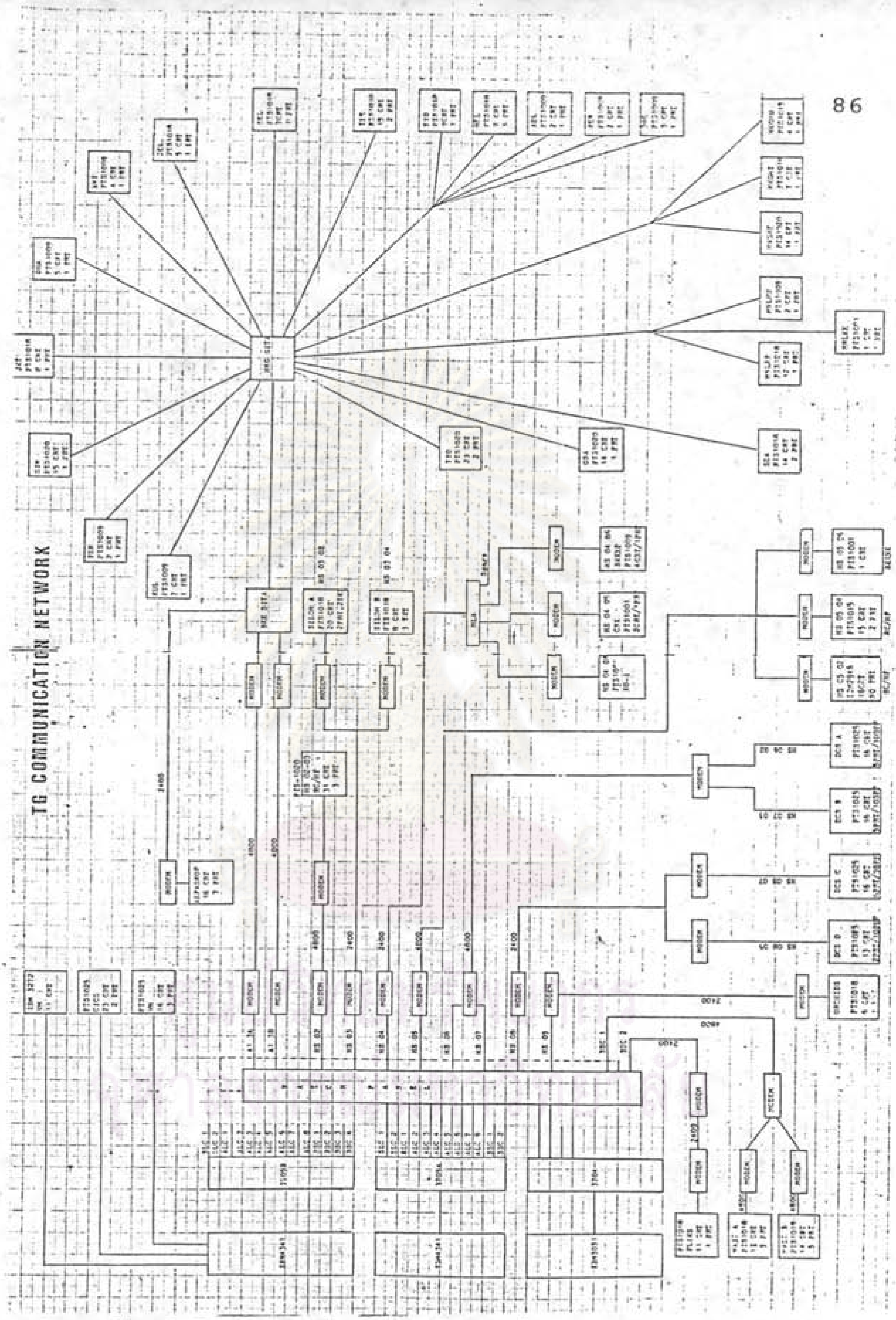
Note: A transmission group may consist of one or more SDLC links (parallel links) or of a single System/370 channel.

transmission header (TH). In SNA, control information, optionally followed by a basic information (BIU) or a BIU segment, that is created and used by path control to route message units and to control their flow within the network. See also *path information unit (PIU)*.

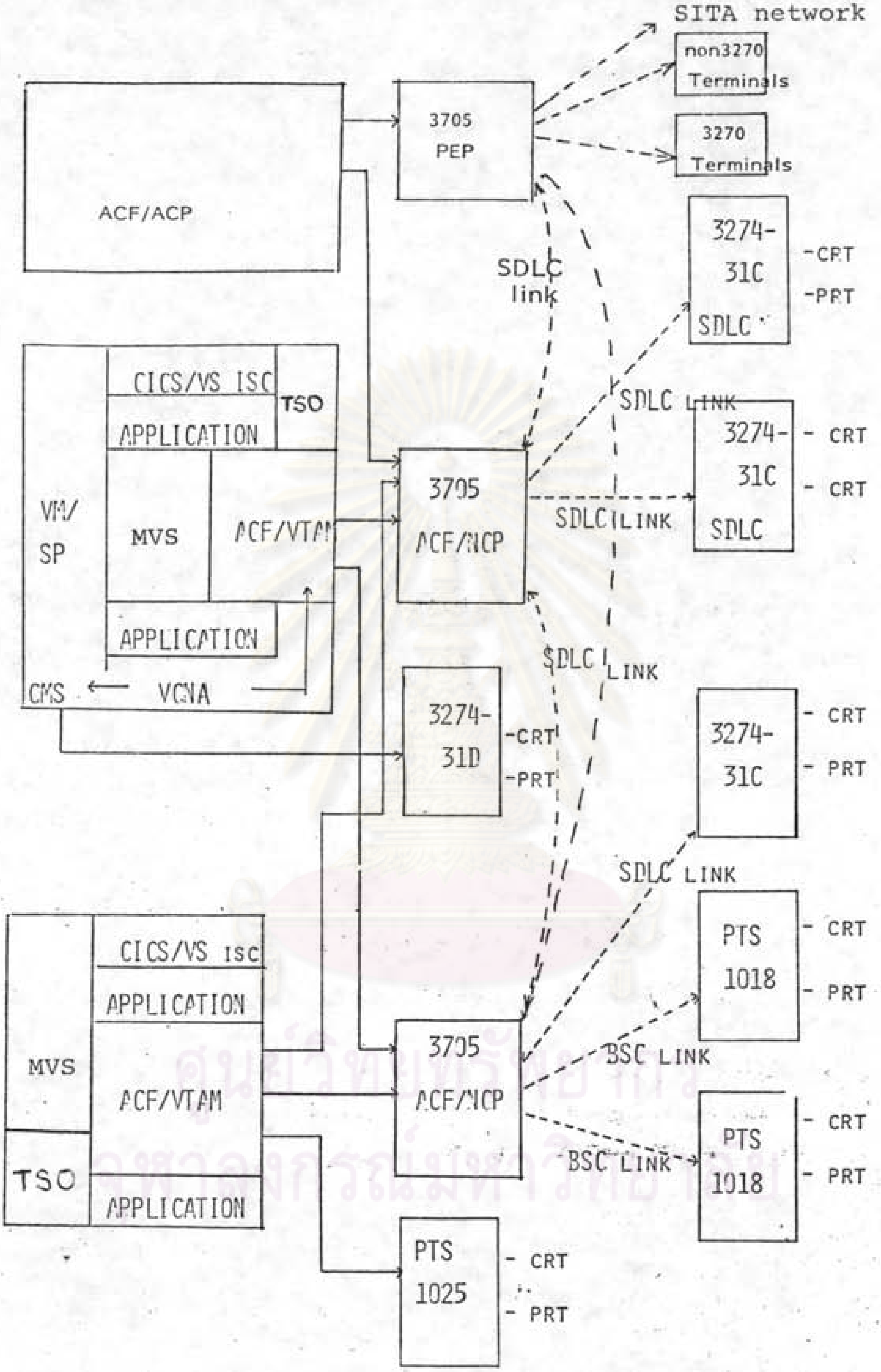
user-application network. A configuration of data processing products (such as processors, controllers, and terminals) established and operated by users for the purpose of data processing or information exchange, which may use services offered by communication common carriers or telecommunication Administrations. Contrast with *public network*.

virtual route (VR). In SNA, a logical connection (1) between two subarea nodes that is physically realized as a particular explicit route, or (2) that is contained wholly within a subarea node for intra-node sessions. A virtual route between distinct subarea nodes imposes a transmission priority on the underlying explicit route, provides flow control through virtual-route pacing, and provides data integrity through sequence numbering of path information units (PIUs). See also *explicit route, path, route extension (REX)*.

virtual route (VR) pacing. In SNA, a flow control technique used by the virtual route control component of path control at each end of a virtual route to control the rate at which path information units (PIUs) flow over the virtual route. VR pacing can be adjusted according to traffic congestion in any of the nodes along the route. See also *pacing, session-level pacing*.



Appendix A TG Communication Network



Appendix B ACP/TPF in a Designed SNA Network

Appendix C Fortran Program to Calculate Response time

```
FILE: SNA24    FORTRAN  B1                    VM/SP CONVERSATIONAL MONITOR SYSTEM

        REAL L,LC(9),LS(9),TS(9),TW(9),TR(9),R(9),N(9)
        REAL NA,NB
        DIMENSION NAME(9)
C      TOTAL SYSTEM TRANSACTION RATE = L  MESSAGES PER SECOND
       WRITE (8,801)
801    FORMAT (2X,' ENTER CASE NUMBER   1 = 2400 BPS, TCPU =0.316',/,
     C                 '                2 = 4800 BPS, TCPU =0.316',/,
     C                 '                3 = 2400 BPS, TCPU =0.158',/,
     C                 '                4 = 4800 BPS, TCPU =0.158',/)
       READ (5,*)ICASE
       IF(ICASE.EQ.1)GOTO 11
       IF(ICASE.EQ.2)GOTO 22
       IF(ICASE.EQ.3)GOTO 33
       IF(ICASE.EQ.4)GOTO 44
11      BPS =2400
        TCPU = 0.316
        GOTO 55
22      BPS =4800
        TCPU = 0.316
        GOTO 55
33      BPS =2400
        TCPU = 0.158
        GOTO 55
44      BPS =4800
        TCPU = 0.158
        GOTO 55
C       NO OF 3274 = 4 = V
55      V = 4
        WRITE(7,707)BPS,TCPU,V
707     FORMAT (2X,'BPS=',F7.1,'   CPU TS=',F7.4,'   NO OF 3274=',F4.2)
       DO 888 K=1,100
       L = FLOAT(K)/10
C      L  =    2.0
C COMPONENT TRANSACTION RATES  (LC)  :
C  1   3274    =  L/4    =  2/4    =    0.5   MESSAGE PER SECOND
       LC(1)   =    L/V
       N(1)    =    1.0
C  2   3705    =  L/1    =              2.0   MESSAGE PER SECOND
       LC(2)   =    L/1
       N(2)    =    1.0
C  3   CPU     =  L/1    =              2.0   MESSAGE PER SECOND
       N(3)    =    1.0
       LC(3)   =    L/1
C  4   DISK A =  L X 0.8 X 3    = 4.8         MESSAGE PER SECOND
       NA = 0.8
       N(4)    =    3.0
       LC(4)   =    L*NA*N(4)
C      DISK B =  L X 0.2 X 2    = 0.8         MESSAGE PER SECOND
       NB = 0.2
       N(5)    =    2.0
       LC(5)   =  L*NB*N(5)
C MEAN A+B
       LC(6)   =    (LC(4)+LC(5))
       N(6)    =    LC(6)/2.0
C PERDRIVE =MEAN /3.0 DRIVES
```

FILE: SNA24 FORTRAN B1 VM/SP CONVERSATIONAL MONITOR SYSTEM

```
      LC(7)   =   LC(6)/3.0
      N(7)    = 1.0
C   L =2 LINK = 4, LC=L/4 = 0.5
      LC(8)   =   L/V
      N(8)    =   1
      N(9)    =   1
C
C
C SERVICE TIMES 3274 = 350 MS
      TS(1)   = 0.35
C SERVICE TIMES 3705 = 40  MS
      TS(2)   = 0.04
C SERVICE TIMES CPU  = 316 MS
      TS(3)   = TCPU
C SERVICE TIMES DISK = 134 MS
      TS(4)   = 0.134
      TS(5)   = 0.134
      TS(6)   = 0.134
      TS(7)   = 0.134
C
C     4 X 3274 CLUSTER CONTROLLERS
C     4 X FULL DUPLEX DATA LINKS (POINT TO POINT)
C TOTAL SYSTEM LOAD          L  =    2.0  TRANSACTION / SECOND
C COMPONENT LOAD                =    LC   TRANSACTION / SECOND
C SERVICE TIME                  =    TS   TRANSACTION / SECOND
C COMPONENT SATURATION LOAD LS =  L/(LC*TS)= MAX LOAD
C UTILIZATION                R  =    LC*TS
C TIME WAITING FOR SERVICE   TW =  R*TS/(1-R)
C NUMBER OF TIMES               =    N
C                       A       B
C        L1    =       10      60
C RECEIVE L1AR =       10    CHARACTERS
         L1AR = 10
C RECEIVE L1BR =       60    CHARACTERS
         L1BR = 60
C        L2    =              800  (CHAINED INTO 4 MESSAGES)
C TRANSMIT L1AT=      150    CHARACTERS
         L1AT = 150
C TRANSMIT L1BT=      800    CHARACTERS
         L1BT = 800
C SPEED = 2400 BPS
C        TS(R)           TS(T)           T*S(R)            T*S(T)
C A  (10+15)8/2400  (150+15)8/2400   TS(R)+12X8/2400   TS(T)+6X8/2400
C    =  XXXX           =  0.55          =  XXXX          =    0.57
C
C B  (60+15)8/2400  (800 +60 )8/2400 TS(R)+12X8/2400   TS(T)+6X8/2400
C    =  0.15           =  YYYY          =  0.19          =    YYYY
         TSRA = (L1AR+15)*8/BPS
         TSTA = (L1AT+15)*8/BPS
         TKSRA = TSRA +  12*8/BPS
         TKSTA = TSTA +   6*8/BPS
C
         TSRB = (L1BR+15)*8/BPS
         TSTB = (L1BT+60 )*8/BPS
         TKSRB = TSRB +  12*8/BPS
```

```
      TKSTB = TSTB +    6*8/BPS
      TS8   = (TSTA+TSRA)*NA + (TSTB+TSRB)*NB
      TS9   = (TKSTA+TKSRA)*NA + (TKSTB+TKSRB)*NB
      WRITE(6,610)TSRA,TSTA,TKSRA,TKSTA
      WRITE(6,610)TSRB,TSTB,TKSRB,TKSTB
      WRITE(6,611)TS8,TS9
610   FORMAT(2X,F5.2,3X,F5.2,3X,F5.2,3X,F5.2)
611   FORMAT(2X,'TS8=',F8.3,3X,'TS9=',F8.3)
612   FORMAT(2X,F5.2,3X,F5.2)
      TS(8)  = TS8
      TS(9)  = TS9
C COMPONENT RESPONSE TIME    TR =   (TS+TW)*N
       DO 100  I=1,3
       LS(I)  = L/(LC(I)*TS(1))
       R(I)   = LC(I)*TS(I)
       IF  (R(I).GT.1.00)  GOTO 999
       TW(I)  = R(I)*TS(I)/(1-R(I))
       TR(I)  =  (TS(I)+TW(I))*N(I)
100    CONTINUE
       LS(7)  = L/(LC(7)*TS(7))
       R(7)   = LC(7)*TS(7)
       IF  (R(7).GT.1.00)  GOTO 999
       TW(7)  = R(7)*TS(7)/(1-R(7))
       TR(7)  =  (TS(7)+TW(7))*N(7)
C
       LS(8)  = L/(LC(8)*TS(9))
       R(8)   = LC(8)*TS(8)
       IF  (R(8).GT.1.00)  GOTO 999
       TW(8)  = R(8)*TS(8)/(1-R(8))
       TR(8)  =  (TS(8)+TW(8))*N(8)
       TW(9)=TW(8)
       R(9)=R(8)
       TW(4)=TW(7)
       TW(5)=TW(7)
       TW(6)=TW(7)
       DO 102  I=4,6
       TR(I)  =  (TS(I)+TW(I))*N(I)
102    CONTINUE
777    WRITE (6,600) (I,LC(I),TS(I),LS(I),R(I),TW(I),N(I),TR(I),
     C  I=1,9)
600    FORMAT(2X,I3, 4X, F4.2, 3X, F5.2, 3X, F5.2,3X,F5.2,3X,
     C  F5.2, 3X, F3.1, 3X, F5.2)
C
C AVERAGE RESPONSE TIME     TRES
      TRES   = TR(1)+TR(2)+TR(3)+TR(6)+TR(8)
C ZERO LOAD TIME  TZERO
      TZERO =TS(1)+TS(2)+TS(3)+TS(6)*N(6)+TS9
      Y = TZERO/TRES
      X = L
      WRITE(6,620)TRES,TZERO,Y,X
620   FORMAT(2X,'TR=',F5.2,3X,'TS=',F5.2,3X,'Y=',F5.2,3X,'X=',F5.2)
      WRITE(7,700)X,Y
700   FORMAT(2X,'X=',F5.2,3X, 'Y=',F10.5)
888   CONTINUE
999   STOP
      END
```

OUT PUT DATA FROM CASE 1

BPS= 2400.0 CPU TS= 0.3160 NO OF 3274=4.00

X=	0.10	Y=	1.00702
X=	0.20	Y=	0.98147
X=	0.30	Y=	0.95600
X=	0.40	Y=	0.93061
X=	0.50	Y=	0.90526
X=	0.60	Y=	0.87993
X=	0.70	Y=	0.85462
X=	0.80	Y=	0.82928
X=	0.90	Y=	0.80391
X=	1.00	Y=	0.77847
X=	1.10	Y=	0.75293
X=	1.20	Y=	0.72728
X=	1.30	Y=	0.70148
X=	1.40	Y=	0.67549
X=	1.50	Y=	0.64929
X=	1.60	Y=	0.62282
X=	1.70	Y=	0.59604
X=	1.80	Y=	0.56891
X=	1.90	Y=	0.54136
X=	2.00	Y=	0.51333
X=	2.10	Y=	0.48473
X=	2.20	Y=	0.45547
X=	2.30	Y=	0.42543
X=	2.40	Y=	0.39447
X=	2.50	Y=	0.36238
X=	2.60	Y=	0.32889
X=	2.70	Y=	0.29359
X=	2.80	Y=	0.25577
X=	2.90	Y=	0.21405
X=	3.00	Y=	0.16494
X=	3.10	Y=	0.09507

OUT PUT DATA FROM CASE 2

BPS= 4800.0   CPU TS= 0.3160   NO OF 3274=4.00

X= 0.10	Y= 1.00618
X= 0.20	Y= 0.98873
X= 0.30	Y= 0.97123
X= 0.40	Y= 0.95367
X= 0.50	Y= 0.93603
X= 0.60	Y= 0.91830
X= 0.70	Y= 0.90046
X= 0.80	Y= 0.88248
X= 0.90	Y= 0.86434
X= 1.00	Y= 0.84600
X= 1.10	Y= 0.82745
X= 1.20	Y= 0.80863
X= 1.30	Y= 0.78951
X= 1.40	Y= 0.77004
X= 1.50	Y= 0.75014
X= 1.60	Y= 0.72976
X= 1.70	Y= 0.70879
X= 1.80	Y= 0.68714
X= 1.90	Y= 0.66466
X= 2.00	Y= 0.64118
X= 2.10	Y= 0.61649
X= 2.20	Y= 0.59030
X= 2.30	Y= 0.56222
X= 2.40	Y= 0.53175
X= 2.50	Y= 0.49817
X= 2.60	Y= 0.46046
X= 2.70	Y= 0.41708
X= 2.80	Y= 0.36565
X= 2.90	Y= 0.30223
X= 3.00	Y= 0.21983
X= 3.10	Y= 0.10476

OUT PUT DATA FROM CASE 3

BPS= 2400.0   CPU TS= 0.1580   NO OF 3274=4.00

X=	0.10	Y=	1.01217
X=	0.20	Y=	0.98867
X=	0.30	Y=	0.96524
X=	0.40	Y=	0.94186
X=	0.50	Y=	0.91852
X=	0.60	Y=	0.89518
X=	0.70	Y=	0.87185
X=	0.80	Y=	0.84848
X=	0.90	Y=	0.82507
X=	1.00	Y=	0.80160
X=	1.10	Y=	0.77803
X=	1.20	Y=	0.75434
X=	1.30	Y=	0.73050
X=	1.40	Y=	0.70649
X=	1.50	Y=	0.68227
X=	1.60	Y=	0.65780
X=	1.70	Y=	0.63304
X=	1.80	Y=	0.60796
X=	1.90	Y=	0.58249
X=	2.00	Y=	0.55658
X=	2.10	Y=	0.53016
X=	2.20	Y=	0.50317
X=	2.30	Y=	0.47551
X=	2.40	Y=	0.44709
X=	2.50	Y=	0.41777
X=	2.60	Y=	0.38744
X=	2.70	Y=	0.35592
X=	2.80	Y=	0.32300
X=	2.90	Y=	0.28846
X=	3.00	Y=	0.25198
X=	3.10	Y=	0.21320
X=	3.20	Y=	0.17164
X=	3.30	Y=	0.12672
X=	3.40	Y=	0.07764
X=	3.50	Y=	0.02336

OUT PUT DATA FROM CASE 4

BPS= 4800.0 CPU TS= 0.1580 NO OF 3274=4.00

X= 0.10	Y= 1.01386
X= 0.20	Y= 1.00076
X= 0.30	Y= 0.98766
X= 0.40	Y= 0.97456
X= 0.50	Y= 0.96146
X= 0.60	Y= 0.94836
X= 0.70	Y= 0.93525
X= 0.80	Y= 0.92213
X= 0.90	Y= 0.90901
X= 1.00	Y= 0.89589
X= 1.10	Y= 0.88276
X= 1.20	Y= 0.86963
X= 1.30	Y= 0.85648
X= 1.40	Y= 0.84333
X= 1.50	Y= 0.83018
X= 1.60	Y= 0.81701
X= 1.70	Y= 0.80383
X= 1.80	Y= 0.79065
X= 1.90	Y= 0.77746
X= 2.00	Y= 0.76425
X= 2.10	Y= 0.75103
X= 2.20	Y= 0.73780
X= 2.30	Y= 0.72456
X= 2.40	Y= 0.71130
X= 2.50	Y= 0.69802
X= 2.60	Y= 0.68473
X= 2.70	Y= 0.67143
X= 2.80	Y= 0.65810
X= 2.90	Y= 0.64476
X= 3.00	Y= 0.63139
X= 3.10	Y= 0.61800
X= 3.20	Y= 0.60459
X= 3.30	Y= 0.59115
X= 3.40	Y= 0.57769
X= 3.50	Y= 0.56419
X= 3.60	Y= 0.55067
X= 3.70	Y= 0.53711
X= 3.80	Y= 0.52351
X= 3.90	Y= 0.50987
X= 4.00	Y= 0.49619
X= 4.10	Y= 0.48246
X= 4.20	Y= 0.46868
X= 4.30	Y= 0.45484
X= 4.40	Y= 0.44093
X= 4.50	Y= 0.42696
X= 4.60	Y= 0.41290
X= 4.70	Y= 0.39875
X= 4.80	Y= 0.38450
X= 4.90	Y= 0.37014
X= 5.00	Y= 0.35563
X= 5.10	Y= 0.34097
X= 5.20	Y= 0.32611
X= 5.30	Y= 0.31102
X= 5.40	Y= 0.29564
X= 5.50	Y= 0.27990
X= 5.60	Y= 0.26368
X= 5.70	Y= 0.24682
X= 5.80	Y= 0.22905
X= 5.90	Y= 0.20987
X= 6.00	Y= 0.18838
X= 6.10	Y= 0.16248
X= 6.20	Y= 0.12609
X= 6.30	Y= 0.05067

Appendix D

SYSTEM SOFTWARE

SNA PROGRAM THAT CONTROL SNA NETWORK ACCESS METHOD

Access method programs are primarily responsible for routing data between host processor storage and the input/output devices in the SNA network.

The access methods summarized are:

- Advanced Communications Function for the Telecommunications Access Method (ACF/TCAM)
- Advanced Communication Function for the Virtual Telecommunication Access Method (ACF/VTAM)
- Advanced Communications Function for VTAM Entry (ACF/VTAME)

ACF/VTAM

The ACF/VTAM program product is an SNA access method that controls communication between logical units in a network. ACF/VTAM directly controls the transmission of data to and from channel- attached devices and use ACF/NCP/VS to forward data to and from devices attached by communication lines. Logical units can communicate without knowledge of intermediate connections such as communication lines and communication controllers.

To provide this communication, the ACF/VTAM base program product:

- Permits the use of logical units by name, without specific knowledge of their location or addresses
- Controls allocation of network resources
- Permits sharing of such network resources as communication lines, communication controllers, and terminals
- Establishes, controls, and terminates sessions between logical units in its domain
- Transfers data between logical units
- Permits the ACF/VTAM operator to monitor and alter

operation of the domain
- Permits the network configuration to be changes while the network is operating
- Permits use of Time Sharing Option (OS/VS2 MVS only)

ACF/VTAM (TSO/VTAM)

The Multisystem Networking Facility is an Optional feature of ACF/VTAM that enable logical units in one domain to communicate with logical units in other domains in its network configuration that have multiple host processors and multiple access methods. To provide the cross-domain communication, ACF/VTAM with Multisystem Networking Facility :

- Establishes, controls, and terminates sessions between logical units in the ACF/VTAM domain and logical units in other domain.
- Allows control of one host processor's communication controllers to be shares by or transferred to another host processor.

ACF/VTAM is available for MVS, OSVS1 and VSE systems. It supports channel-attached SNA and non-SNA devices through loop adapter. Through ACF/NCP/VS , ACF/VTAM supports SDLC-attached SNA devices and BSC 3270 terminals (Non-SNA device other than BSC 3270 are supported only in conjunction with Network Terminal Option (NTO) program product or with user routines and user-written network addressable units that execute as a part of ACF/NCP/VS).

Information Management System/ Virtual Storage(IMS/VS)

The Information Management System/ Virtual Storage and the features available for use with it provide a variety of services for the application programs that can operate in an SNA network. Examples of applications that can be use IMS/VS are:

- Payroll record applications
- Personnel record applications
- Manufacturing bill of material applications
- Inventory control applications
- Accounts receivable applications
- Transaction processing applications

Customer Information Control System/ Virtual Storage (CICS/VS)

The Customer Information Control System/ Virtual Storage provides a variety of services for the application programs that can operate in an SNA network. Examples of applications that can use CICS/VS are:

- Inquiry applications
- Inquiry with update applications
- Data entry application
- Batch processing applications
- Message switching applications

All of these kinds of applications can be handled concurrently by CICS/VS.

Airline Control Program / Transaction Processing Facility (ACP/TPF)

ACP/TPF is a reliable, highly responsive, performance-oriented transaction processing system for realtime, transaction-driven applications that must accommodate high message rates. ACF/TPF systems are characterized by thousands of terminals dispersed over a large geographic area, where each location may have from one to several hundred terminals. ACP/TPF provides realtime inquiry a nd update to a large, centralized data base, where message length is generally short in both directions and response time is generally less than three seconds. ACP/TPF is applicable to any online, transaction-oriented application that requires fast response time from a large number of terminals. Some examples of applications are airline seat reservations, hotel reservations, car rental reservations and billing, credit authorization and verification, and loan payment processing.

Time Sharing Option(TSO)

TSO is a full function time sharing system that provides interactive computing for the large system environment. TSO is a component of the OS/VS2(MVS) operating system. TSO support an extensive range of terminals through ACF/TCAM and ACF/VTAM. Terminals may be shared between TSO and other ACF/TCAM or ACF/VTAM applications. Interfaces to high speed remote job entry (RJE) facilities in JES2 and JES3 are provided. TSO has a comprehensive, easy to use edit capability for creating and manipulating data , programs and

JCL (job control language) files. TSO satisfies the needs of the following people and gives them the full power of a large computer through a terminal:

- System programmers: for maintaining system libraries, catalogs, and procedure libraries.
- Application programmers: for developing new applications: batch, interactive, and data base/data communication (DB/DC) and for maintain existing application programs.
- Programming librarians: for creating, maintaining, and controlling development: support and production libraries.
- Problem solvers who need full operating system facilities.
- End user of interactive programs.
- As part of MVS, TSO offers the widest range of computer functions, through the widest range of terminals, to the widest range of users of any IBM interactive computing system.

Virtual Machine/ VTAM Communication Network Application (VM/VCNA)

The Virtual Machine/VTAM Communication Network Application (VM/VCNA) allows users at display or keyboard/printer terminals in an SNA network to LOGON to and use the facilities of VM/370 and Conversational Monitoring System(CMS) as virtual machine console operators. VM/VCNA allows SNA users access to VM/CMS and allow VM/370 to better participate in an SNA network. VM/VCNA is an ACF/VTAM or ACF/VTAME application that is executed in a VM/SP virtual machine (VM/SP is a program product that extends the function of VM/370).

ACF/NCP/VS

ACF/NCP/VS is an Advanced Communications Function program product for the 3705-2 in an SNA network. ACF/NCP/VC uses SNA formats and protocols to interact with an ACF access method (that is, ACF/TCAM,ACF/VTAM, and ACF/VTAME) to control the operation of a network. Release 3 of ACF/NCP/VS provides communication control functions for a single domain network or a multiple domain network. The communication control functions include:

- Polling and addressing of stations on multipoint links
- Dialing and answering stations over a switched

network

- recognizing and reacting appropriately to device control characters
- Translating machine codes to appropriate line and device codes for data transmitted using the binary synchronous link protocol
- Dynamically allocating buffers from controller storage as data is received from either a host processor or a station
- Selecting communication line speeds
- Maintaining error records for the 3705-2 hardware, the links and devices attached to the 3705-2, and the network control program.
- ACF/NCP/VS release 3 provides program functions that permit it to operate in a multiple domain network.

VITA

Name: Mr. Chumchok Namsrisakulrat

Date and Place of birth: November 27,1955, Bangkok Thailand

Education: March,1974. Certificate of Higher Vocational in Electronic Mechanic, King Mongkut's Institute of Technology, North Bangkok Campus, Thailand.

April,1978. Bachelor Degree in Electrical Engineering (Hon.), King Mongkut's Institute of Technology, North Bangkok Campus, Thailand.

Present Position: Advanced Customer Service Representative, IBM Thailand Co., Ltd. 1 Silom Road, Bangkok, Thailand. Tel. 2330110, 2330160