


Internetwork_Design_Guide_--_SNA_Host_Configuration_for_SRB_Networks

When designing source-route bridging (SRB) internetworks featuring routers and IBM Systems Network Architecture (SNA) entities, you must carefully consider the configuration of SNA nodes as well as routing nodes. This article provides examples that focus on three specific SNA devices:

- Front-end processors (FEPs)
- Virtual Telecommunications Access Method (VTAM)-switched major nodes
- 3174 cluster controllers

Figure: Typical SNA host environment illustrates a typical environment. Table: BUILD Definition Parameters through Table: FEP Logical Unit (LU) Definition Parameter present the definition parameters for the devices shown in Figure: Typical SNA host environment.

 **Note:** This material provides host-related configuration information pertinent to design material provided in Designing SRB Internetworks.

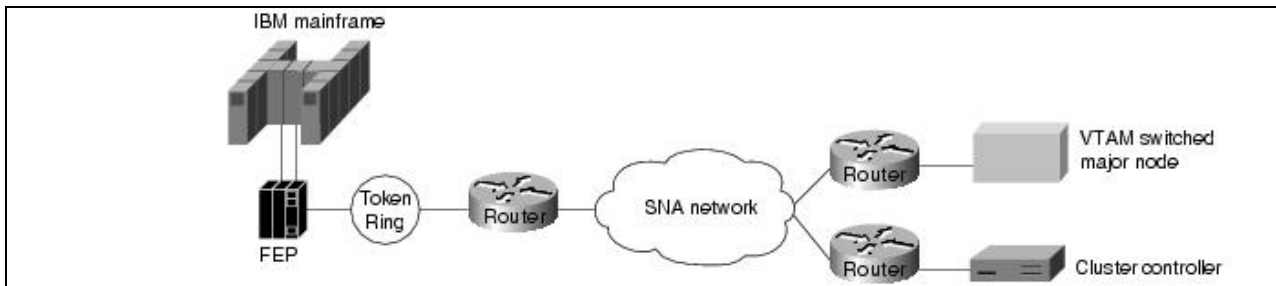
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Figure: Typical SNA host environment



FEP Configuration

The parameters listed in [Table: BUILD Definition Parameters](#) through [Table: FEP Logical Unit \(LU\) Definition Parameter](#) illustrate input to the Network Control Program (NCP) system generation process that runs in the host processor using the Network Definition Facility (NDF). The NDF is part of the ACF/NCP/System Support Program utility. The output produced by the generation process is a load module that runs in an FEP. Its typical size can be slightly under one MB to more than three MB. The ACF/NCP/System Support Program utility is also used for loading and dumping an FEP.

The following tables outline relevant parameters for generating Token Ring resources.

Table: BUILD Definition Parameters

Parameter	Example, Parameter Value, or Range	Parameter Description and Implementation Notes
LOCALTO	1.5	Local ring acknowledgment timer (seconds).
REMOTTO	2.5	Remote ring acknowledgment timer (seconds).
MAXSESS	5000	Maximum amount of sessions for all attached resources.
MXRLINE	None	Maximum number of NTRI physical connections (Version 5.2.1 and earlier only).
MXVLINE	None	Maximum number of NTRI logical connections (Version 5.2.1 and earlier only).
T2TIMER	(localt2, remott2, N3)	(Version 5.R4 and later only.) Parameters specify a receiver acknowledgement/timer(T2) for local and remote Token Rings whether from peripheral or subarea nodes. Acceptable values: localt2 range is 0 to 2.0 seconds; remott2 range is 0 to 2.0 seconds; N3 range is 1 to 127 (default is 2). The values for localt2 and remott2 should be 10.0 percent of the value of the adjacent stations's T1 timer. N3 specifies the maximum number of I-frames received without sending an acknowledgment for subarea connections.

The LUDRPOOL definition shown in [Table: LUDRPOOL Definition Parameters](#) specifies the number of peripheral resources required for the correct amount of control block storage to be reserved for new

connections.

Table: LUDRPOOL Definition Parameters

Parameter	Example, Parameter Value, or Range	Parameter Description and Implementation Notes
NUMTYP2	None	Maximum is 16,000.
NUMILU	None	Required for LU Type 2.1 devices (independent LUs).

The GROUP definition shown in [Table: GROUP Definition Parameters](#) specifies group definition parameters.

Table: GROUP Definition Parameters

Parameter	Example, Parameter Value, or Range	Parameter Description and Implementation Notes
AUTOGEN	Number	Specifies the number of LINE/PU pairs for this group.
COMPOWN	Y	Twin FEP backup capable resource.
COMPSWP	Y	TIC portswap capable (hot backup).
COMPTAD	Y	TIC capable of IPL loading FEP.
DIAL	YES or NO	Applies to ECLTYPE parameter specifications. YES required for (LOGICAL,PERIPHERAL); NO required for all other combinations indicated in ECLTYPE specification.
ECLTYPE	(PHYSICAL,ANY) (PHYSICAL, PERIPHERAL) (PHYSICAL, SUBAREA) (LOGICAL, PERIPHERAL) (LOGICAL, SUBAREA)	Allows PU 4 and PU 2 devices to attach. Allows PU 2 devices only. Allows PU 4 devices only. Defines devices attaching as PU 2. Defines devices attaching as PU 4.
LNCTL	SDLC	Required for NCP processing compatibility.
PHYPORT	None	Required for ECLTYPE LOGICAL only; links this to a ECLTYPE PHYSICAL.
TIMER	error, ras, stap, or lstap	Entry points for NTRI timer routines.

The LINE definition shown in [Table: LINE Definition Parameters](#) specifies line definition parameters.

Table: LINE Definition Parameters

Parameter	Example, Parameter Value, or Range	Parameter Description and Implementation Notes
ADAPTER	TIC1 TIC2	4-MB Token Ring interface 4- or 16-MB Token Ring interface
ADDRESS	1088 to1095	Range of valid addresses for TICs; only one specified per LINE definition
BEACTO	52	

Table: BUILD Definition Parameters

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		Time in seconds the ring can beacon before TIC considers it down; maximum is 600
LOCADD	4000abbbbbbb	Locally administered TIC address, where <i>a</i> is any value from 0 to 7; and <i>b</i> is any integer value from 0 to 9
LOCALTO	1.5	V5R4; same as in BUILD, but only for PU 4 (LOGICAL, SUBAREA) devices; allows granularity for individual TICs for SUBAREA connections
REMOTTO	2.5	V5R4 parameter; same as LOCALTO; see BUILD parameters in [[Internetwork Design Guide -- SNA Host Configuration for SRB Networks#Table 1
T2TIMER	<i>localt2, remott2, N3</i>	V5.4 parameter; see BUILD parameters in [[Internetwork Design Guide -- SNA Host Configuration for SRB Networks#Table 1Table; ; can be defined in LINE definition only if a subarea node was defined in GROUP definition
MAXTSL	2044 to 16732	Specifies maximum data in bytes that NTRI can transmit; TIC1 maximum is 2044; TIC2 maximum at TRSPEED16 is 16732
PORTADD	Number	For association of physical to logical ECLTYPEs; matches physical or logical ECLTYPE specification
RETRIES	<i>m, t, n, ml</i>	Where <i>m</i> = number of retries for remote ring sessions, <i>t</i> = pause between retry sequence, <i>n</i> = number of retry sequences, and <i>ml</i> = number of retries in a sequence for local ring sessions
TRSPEED	4 or 16	TIC speed

Table: FEP Physical Unit (PU) Definition Parameters specifies physical unit (PU) definition parameters.

Table: FEP Physical Unit (PU) Definition Parameters

Parameter	Example, Parameter Value, or Range	Parameter Description and Implementation Notes
ADDR	<i>aa4000bcccccc</i>	Destination service access point (DSAP) and MAC address for the PU of the Token Ring device in the FEP, where <i>aa</i> = the DSAP and is a nonzero hexadecimal multiple of 4; <i>>b</i> = 0 to 7;
		<i>c</i> = 0 to 9; enter 4000 as shown; only specified if ECLTYPE defined in GROUP definition is one of the following: (LOG,SUB), (PHY,SUB), (PHY,ANY)
PUTYPE	1, 2, or 4	Depends on ECLTYPE: For NTRI LOGICAL resources, only PUTYPE=2 is valid; for NTRI PHYSICAL resources, only PUTYPE=1 is valid For NTRI PHYSICAL/SUBAREA LINES and PHYSICAL PERIPHERAL LINES, only PUTYPE=1 is valid. For NTRI LOGICAL PERIPHERAL LINES, only PUTYPE=2 is valid
XID	YES or NO	Defines the capability of a PU to receive and respond to an XID while in normal disconnected mode; for NTRI LOGICAL LINES, only YES is valid; for NTRI PHYSICAL LINES, only NO is valid

Table: LINE Definition Parameters

Table: FEP Logical Unit (LU) Definition Parameter specifies logical unit (LU) definition parameters.

Table: FEP Logical Unit (LU) Definition Parameter

Parameter	Example, Parameter Value, or Range	Parameter Description and Implementation Notes
LOCADDR	0	Specify this response only

VTAM-Switched Major Node Definitions

Devices that are attached to Token Ring and communicate with an IBM host application must be defined via the VTAM access method associated with the host. These devices are seen as dial-in resources from the host side and are defined in a configuration component named Switched Major Node. Some common definitions used in network configurations are outlined in [Table: VBUILD Definition Parameter](#) through [Table: VTAM LU Definition Parameter](#).

Table: VBUILD Definition Parameter

Parameter	Example, Parameter Value, or Range	Parameter Description and Implementation Notes
TYPE	SWNET	Specifies a type of resource for VTAM; SWNET indicates switched major node type

Table: VTAM PU Definition Parameters

Parameter	Example, Parameter Value, or Range	Parameter Description and Implementation Notes
IDBLK	017	Typical values: 017 = 3X74 05D = PC-base VTAM PU 0E2 = Cisco SDLLC (registered with IBM)
IDNUM	xxxxx	Unique number identifying a device
MAXOUT	1 to 7	Number of I-frames sent before acknowledgment is required
MAXDATA	265	Indicates maximum number of bytes a PU 2 device can receive; ignored for PU 2.1, as this value is negotiable Default for 3174 is 521
PUTYPE	2	Only valid value
XID	YES or NO	YES should be used for PU 2.1 devices NO should be specified for any other device

Table: VTAM LU Definition Parameter

Parameter	Example, Parameter Value, or Range	Parameter Description and Implementation Notes
LOCADDR	2 through FF	Logical unit (LU) addresses attached to a PU

3174 Cluster Controller Configuration Example

The following configuration was taken from 3174-13R cluster controller serial number 45362 connected to a Token Ring. These entries were used with a specific 3174 running on a 4-Mbps Token Ring. The configuration of this 3174-13R involved three specific configuration screens. [Table: 3174-13R Screen 1 Configuration Details](#) through [Table: 3174-13R Screen 3 Configuration Details](#) list the configuration line numbers, entries used, and descriptions of the configuration line. When applicable, extended descriptions are included for configuration entries that are relevant to the requirements of the routed internetwork.


 **Note:** Of particular interest when configuring 3174 devices for a router-based SRB environment are configuration line items 106, 107, and 384 in configuration screen 2 (refer to [Table: VTAM LU Definition Parameter](#)). These specify the required addresses and relevant Token Ring type for the cluster controller.

Table: 3174-13R Screen 1 Configuration Details

Configuration Line Number	Sample Value	Parameter Description and Implementation Notes
98		Online test password
99	TKNRNG	Description field
100	13R	Model number
101	7	Host attachment type

Table: 3174-13R Screen 2 Configuration Details

Configuration Line Number	Sample Value	Parameter Description and Implementation Notes
106	4000 2222 4444 04	The first 12 hexadecimal digits form the source MAC address of the cluster controller (4000 2222 4444); the last two digits are the source SAP (SSAP) for LLC2 (0x04 = SNA).
107	4000 0037 4501 04	The first 12 hexadecimal digits form the destination MAC address of the FEP (4000 0037 4501); the last two digits are the DSAP for LLC2 (0x04 for SNA).
108	0045362	Serial number of the cluster controller
110	0	MLT storage support
116	0	Individual port assignment
121	01	Keyboard language
123	0	Country extended code page support
125	00000000	Miscellaneous options (A)
126	00000000	Miscellaneous options (B)
127	0 0	RTM definition
132	0000	Alternate base keyboard selection
136	0000	Standard keyboard layout
137	0000	Modified keyboard layout
138	0	Standard keypad layout
141	A	Magnetic character set
165	0	Compressed program symbols

166	A	Attribute select keypad
168	0	Additional extension; mode key definition
173	0000	DFT options
175	000000	DFT password
179	000	Local format storage
213	0	Between bracket printer sharing
215	45362	PU identification
222	0	Support for command retry
382	0521	Maximum ring I-frame size; range of values is 265 to 2057.
383	2	Maximum number of I-frames 3174 will transmit before awaiting an acknowledgment (transmit window size).
384	0	Ring speed of the Token Ring network: 0 = 4 Mbps 1 = 16 Mbps normal token release 2 = 16 Mbps early token release

Table: 3174-13R Screen 3 Configuration Details

Configuration Line Number	Sample Value	Parameter Description and Implementation Notes
500	0	CSCM unique
501	TOSFNID	Network identifier
503	TOSFCTLR	LU name

SNA end stations implement Logical Link Control type 2 (LLC2) when attached to a local-area network (LAN). LLC2 implements the following:

- Timers
- Sequencing
- Error recovery
- Windowing
- Guaranteed delivery
- Guaranteed connection

Figure: T1 timer and error recovery process for 3174 illustrates how the T1 reply timer and error recovery operates for a 3174. Assume that the link between the two routers just failed. The following sequence characterizes the error recovery process illustrated in Figure: T1 timer and error recovery process for 3174:

1. The 3174 sends a data frame and starts its T1 timer.
2. The T1 timer expires after 1.6 seconds.
3. The 3174 goes into error recovery.
4. The 3174 sends an LLC request (a receiver ready with the poll bit on), which requests the 3745 to immediately acknowledge this frame.
5. The 3174 starts its T1 timer.
6. The T1 timer expires after 1.6 seconds.

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This operation is retried a total of seven times. The total elapsed time to disconnect the session is calculated as follows:

The first attempt plus seven retries multiplied by 1.6 seconds:

= 8 x 1.6 seconds

= 12.8 seconds

Figure: T1 timer and error recovery process for 3174

