HEWLETT® PACKARD

HP LU 6.2 Application Programming Interface

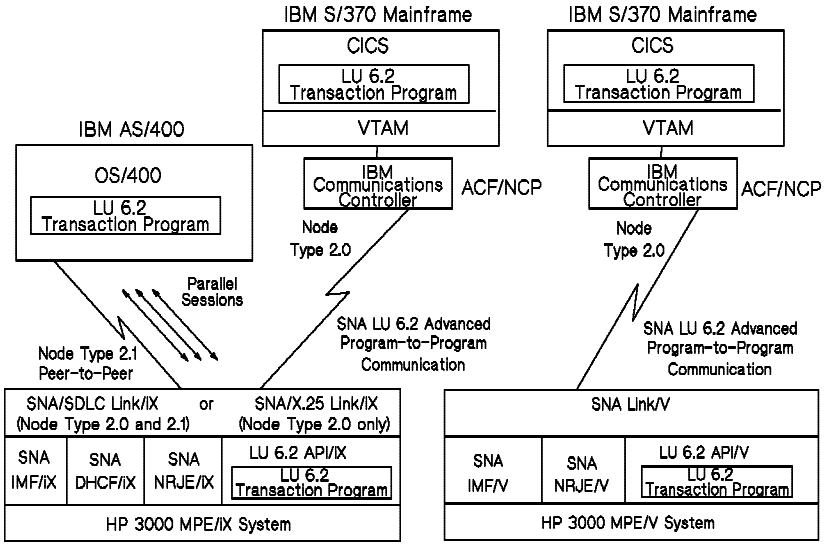
Technical Data

For HP 3000 V or iX Computer Systems Product Numbers 30253A and 30294A

This data sheet describes HP LU 6.2 API (Application Programming Interface) for both MPE V and MPE iX operating systems. The term HP LU 6.2 API is used to refer to both HP LU 6.2 API/V and HP LU 6.2 API/iX products. The terms HP LU 6.2 API/V and HP LU 6.2 API/iX are used when a distinction is necessary.

HP LU 6.2 API/V on an HP 3000 Series 37 through 70 or HP LU 6.2 API/iX on an HP 3000 Series 9xx provides HP 3000 users with a way to program HP 3000 application programs for program-to-program communication in an SNA environment.

HP LU 6.2 API implements the LU 6.2 "mapped conversation verbs" for what IBM has named "advanced program-to-program communications" (APPC). Users may write "transaction programs" that use these verbs (or high-level intrinsics as HP has implemented them) in order to communicate with each other, even though these programs may be executing on different systems within the SNA network.



Features

HP LU 6.2 API provides:

- **High-level Intrinsics**: HP 3000 programmers can use a set of high-level intrinsics to implement program-to-program communication in an SNA network.
- **Support for Major Languages**: Application programs on the HP 3000 can be written in COBOL II, Transact, or Pascal. For LU 6.2 API/iX, C language applications are also supported.

- **Support for IBM Applications**: HP LU 6.2 API supports Mapped Conversations with CICS in an MVS or DOS/VSE environment and Mapped Conversations with VTAM in an MVS environment. With MPE iX Release 4.0 or later, HP LU 6.2 API/iX supports Mapped Conversations in an OS/400 environment.
- **Multiple Sessions**: An HP 3000 application program using LU 6.2 API/V intrinsics may have up to 8 LU-LU sessions running simultaneously. With MPE iX Release 4.0 or later, an HP 3000 application program using LU 6.2 API/iX intrinsics may have up to 256 LU-LU sessions running simultaneously. Each session is responsible for a separate communication task or for adding additional bandwidth to a single communication task.
- **Peer-to-Peer Connectivity**: With MPE iX Release 4.0 or later, LU 6.2 API/iX provides peer-to-peer connectivity to an IBM AS/400 over Node Type 2.1. an HP 3000 may establish LU-LU sessions with an IBM AS/400 over Node Type 2.1 without having to go through a mainframe node.
- **Parallel Sessions**: With MPE iX Release 4.0 or later, LU 6.2 API/iX provides support for parallel sessions over Node Type 2.1. An HP 3000 may establish multiple, simultaneous LU-LU sessions over a single LU-LU pair over Node Type 2.1.
- **Support for Remote Attach** : Remote Attach is the ability of a remote LU 6.2 application to request an HP 3000 LU 6.2 application to start running and begin communication with it.
- **Compatibility with Other SNA Services**: The HP LU 6.2 API is completely compatible with other SNA services offered for the HP 3000 such as SNA Interactive Mainframe Facility (SNA IMF), SNA Network Remote Job Entry (SNA NRJE), and SNA Distributed Host Command Facility/iX (SNA DHCF/iX). These products may all be running simultaneously over the same SNA Link/V, SNA/SDLC Link/iX, or SNA/X.25 Link/iX to the SNA network. The SNA Link products manage the physical link to the IBM host and implement protocols in the lower three layers of SNA.

  Note: HP LU 6.2 API/iX supports Native-mode HP 3000 applications only.

- **Trace Facility**: An easy-to-use trace facility that allows HP 3000 application programmers to track all LU 6.2 intrinsic calls and executions within applications being developed, serving as a valuable debugging aid during program development.
- **Logging Facility**: A comprehensive logging facility that records all online LU 6.2 API session messages to aid in problem identification and resolution.
- **User Controlled Sessions Management from Program or CI (CNOS)**: With MPE iX Release 4.0 or later, Programmatic or interactive user-controlled session management allows users to change session limits (over Node Type 2.1).
- **Enhanced Communication Rates**: The maximum datacom line speed between the HP 3000 and the IBM mainframe host is 56 Kbps on MPE/V and 64 Kbps on MPE/iX.
- Efficient and easy-to-program problem detection and recovery procedures.
- As with all HP SNA services, customizable error and help facilities are provided.
- **X.25 Connectivity**: HP LU 6.2 API/iX can communicate to an IBM mainframe over an X.25 connection. The SNA/X.25 Link/iX product (HP 30298A) can be used in place of SNA/SDLC Link/iX, but SNA/X.25 Link/iX emulates a Type 2.0 node, not a Type 2.1 node. Therefore if you run LU 6.2 API/iX over SNA/X.25 Link/iX, you cannot communicate, peer-to-peer with a Type 2.1 node like an IBM AS/400.

Functional Description

HP LU 6.2 API provides a set of high-level intrinsics for application programmers to use for program-to-program communication between an HP 3000 application program and an application program running on an IBM host mainframe. HP LU 6.2 API/iX also provides communication to an IBM AS/400. These intrinsics are responsible for initiating LU 6.2 conversations so that data can be sent or received over these conversations on behalf of program pairs needing to communicate to complete a "transaction." Examples of transactions are database updates and file transfers. LU 6.2 API consists of a set of user-callable intrinsics that implement the set of LU 6.2 defined mapped verbs along with the following option sets:

LU 6.2 API intrinsics are summarized in the following table.

LU 6.2 API Intrinsics Summary

Intrinsics	Function
MCALLOCATE	Establishes a mapped conversation between two TPs.
MCCONFIRM	Sends a confirmation request to the remote TP and waits for a reply.
MCCONFIRMED	Sends a confirmation reply to the remote TP in response to receiving a confirmation request.
MCDEALLOCATE	Ends a mapped conversation between TPs.
MCGETALLOCATE	Receives the request from a remote TP to start a conversation and then establishes the conversation.
MCGETATTR	Returns information pertaining to a mapped conversation.
MCFLUSH	Flushes the LU's send buffer.
MCPOSTONRCPT	Causes LU 6.2 API to post the conversation when information arrives.
MCPREPTORCV	Informs the remote TP that the HP 3000 resident TP (the local TP) is ready to receive data over the mapped conversation.
MCRCVANDWAIT	Waits for information to arrive on the mapped conversation and then receives the information. The information can be data, conversation status, or request for confirmation.
MCRCVNOWAIT	Receives any information available on the mapped conversation without waiting.
MCREQTOSEND	Notifies the remote TP that the local TP is requesting to send data for the mapped conversation.
MCSENDDATA	Sends data to the remote TP.
MCSENDERROR	Informs the remote TP that the local TP has detected an error.
MCTEST	Tests the conversation for the receipt of information.
MCWAIT	Waits for the receipt of information on one or more conversations.

Option Sets	IBM-Defined Verbs
• PIP data (both local and remote support)	
• Flush the LU's send buffer	MC_FLUSH
• Prepare to receive (including long locks)	MC_PREPARE_TO_RECEIVE
• Post on receipt	MC_POST_ON_RECEIPT
• Wait for posting to occur	WAIT
• Test for posting or request-to-send received	MC-TEST
• Receive immediate	MC_RECEIVE_IMMEDIATE
• Get conversation attributes	MC_GET_ATTRIBUTES

Product Requirements

Requirements for IBM mainframe hardware and software are the same for both HP LU 6.2 API/V and HP LU 6.2 API/iX.

IBM Mainframe Hardware Requirements:

- An IBM System/370 mainframe. This may be any IBM plug-compatible mainframe that supports 370 architecture.
- A port on an IBM 37xx or compatible communications controller that supports an SNA line. The HP 3000 can also be connected to the Communications Controller via an IBM 3710 Network Controller. (Please check with your HP Sales Representative for specific Communication Controller model support.)

IBM Mainframe Software Requirements:

- Advanced Communication Function for the Virtual Telecommunications Access Method (ACF/VTAM) applications are supported with:
  - Mapped LU 6.2 conversations only
  - ACF/VTAM version 3.2 or later
  - MVS operating system
- Advanced Communication Function for the Network Control Program (ACF/NCP) remote transmission control program version 3.1 or later.
- Customer Information Control System (CICS) applications are supported with:
  - Mapped LU 6.2 conversations only
  - CICS version 1.7 or later
  - ACF/VTAM version 2.1 or later
  - MVS or DOS/VSE operating system

IBM AS/400 Hardware Requirements:

- An IBM AS/400.
- A port on the AS/400 that supports an SNA line.

IBM AS/400 Software Requirements:

- OS/400 Version 1.2 or later.

HP 3000 product requirements:

- For HP LU 6.2 API/V:
  An HP 3000 Series 37-70 computer system, the MPE V operating system, and the SNA Link/V product (HP 30246A).
- For HP LU 6.2 API/iX:
  If connecting to an IBM mainframe: An HP 3000 Series 900 running MPE XL Release 2.2 or MPE iX Release 4.0 or later operating system. The SNA/SDLC Link/iX product (HP 30291A) or the SNA/X.25 Link/ix product (HP 30298A).

  If connecting to an IBM AS/400: An HP 3000 Series 900 running MPE iX Release 4.0 or later operating system. The SNA/SDLC Link/iX product (HP 30291A).
- A full- or half-duplex data communications line (switched or leased) between the HP 3000 and the IBM mainframe or IBM AS/400. A pair of synchronous modems.
  - or -
  An X.25 connection to the IBM mainframe (X.25 not supported to IBM AS/400).
- A block mode terminal that is supported by VPLUS/3000 for configuration.
- A COBOL II, PASCAL, C (HP LU 6.2 API/iX only), or Transact compiler.

Installation and Configuration Policy

The customer is responsible for loading the HP LU 6.2 API software onto the system.

Hewlett-Packard will perform minimum configuration of HP LU 6.2 API in order to verify minimum product functionality. This activity is included in the product purchase price.

Customer Responsibility

The customer is responsible for performing the following tasks in order to successfully install and configure HP LU 6.2 API:

- Providing HP with the information necessary to complete the Network Implementation and Support Plan (NISP), including:
  - System configurations
  - Logical network map identifying relevant traffic flow
  - Physical network map identifying relevant network hardware components.

- Verifying that the necessary host mainframe or AS/400 software is installed and configured to support HP LU 6.2 API. The customer should consult the "HP SNA Products: ACF/NCP and ACF/VTAM Guide" (P/N 5958-8543), the "HP SNA Products: CICS Guide" (P/N 5958-8546), or the "HP SNA Products: AS/400 Guide" (P/N 5960-1629) for details.
- Verifying that SNA Link/V, SNA/SDLC Link/iX, or SNA/X.25 Link/iX is properly installed and configured prior to the installation of HP LU 6.2 API.
- Updating the HP 3000 system to the proper release level and installing the HP LU 6.2 API software using AUTOINST. Refer to the HP 3000 MPE iX Installation and Update Manual (36123-90001) for MPE iX systems or the HP 3000 Software Update Manual (32033-90036) for MPE V systems.
- Verifying that all of the necessary software modules have been successfully installed by AUTOINST and are at the correct version levels using the NMMAINT.PUB.SYS utility.
- Configuring HP LU 6.2 API in order to fully integrate HP LU 6.2 API into the existing customer network.

HP Responsibility

Following the installation of HP LU 6.2 API, HP is responsible for the following:

- Confirming that all of the necessary software modules have been installed and are at the correct version level.
- Configuring 1 LU with 'Unsolicited Bind' equal to 'Y'.
- Starting the APPC subsystem and verifying that the LU is in a PENDING or ACTIVE state.

These steps complete HP's portion of the installation and minimum configuration of HP LU 6.2 API.

Additional Implementation Assistance

For implementation needs that go beyond installation, the customer can either provide self-support, or can purchase additional services from HP. These services include Network Startup and HP ConsultLine. In addition, the customer can also purchase service from HP on a time-and-materials basis.

Network Startup includes implementation scheduling and coordination assistance, network configuration and verification testing, and network documentation.

Ordering Information

HP LU 6.2 API/V:
30253A License to use

Select **one** processor option. Upgrade credits may be used where applicable.

Processor Options:

310	For Series 37, 37XE, or MICROs
320	For Series 39 through 58
330	For Series 64 through 70

In order to receive the upgrade credit, customers must select the upgrade credit option that pertains to their current processor option in addition to the new processor option on the same order.

Upgrade Credit Options:

OCD	Upgrade credit for Option 310
OCE	Upgrade credit for Option 320

HP LU 6.2 API/iX:

30294A License to use

Select **one** User License Option. The User License Option must align with the MPE iX License. Upgrade credits may be used where applicable.

User License Options:

OAF	20-user license
UCY	40-user license
UA9	64-user license
UBD	100-user license
UCN	160-user license
UAT	Unlimited user license

In order to receive the upgrade credit, customers must select the upgrade credit option that pertains to their current processor/user license option in addition to the new user license option on the same order.

Upgrade Credit Options:

UD8 Credit for 20-user license
UCZ Credit for 40-user license
UB9 Credit for 64-user license
UD9 Credit for 100-user license
UDV Credit for 160-user license
UBP Credit for Unlimited user license
OCD For Processor Option 310
OGJ For Processor Option 315
OCE For Processor Option 320
OCF For Processor Option 330
OGL For Processor Option 335
OGM For Processor Option 340
UEK For Processor Option 350

In order to receive the upgrade credit, customers must order the migration credit option in addition to the new MPE iX software option on the same order.

Migration Credit Options for MPE V software to MPE iX software upgrades:

OG1 For MPE V software Option 310
OG2 For MPE V software Option 320
OG3 For MPE V software Option 330

Note: Ordering information for HP 30246A SNA Link/V, HP 30291A SNA Link/iX, and HP 30298A SNA/X.25 Link/iX may be found in this guide under their respective data sheets.

Support Products

HP offers a spectrum of support service products to help plan, implement, operate, and manage your multivendor network throughout the network lifecycle.

For more information, contact your HP Sales Representative, or refer to the HP data sheets for specific support services.

Documentation

For both HP LU 6.2 API/V and HP LU 6.2 API/iX:

5958-8542 HP SNA Products: Manager's Guide
5958-8543 HP SNA Products: ACF/NCP and ACF/VTAM Guide
5958-8646 HP SNA Products: CICS Guide
30294-61000 HP LU 6.2 API: Application Programmer's Reference Manual

For HP LU 6.2 API/iX:

5960-1629 HP SNA Products: AS/400 Guide
30294-61002 APPC Subsystem on MPE iX Node Manager's Guide

For HP LU 6.2 API/V:

30253-90002 LU 6.2 API/V Node Manager's Guide
30253-90004 APPC Subsystem on MPE V Node Manager's Guide

For SNA Link/iX:

30291-61000 SNA Link/iX Node Manager's Guide

For SNA Link/V:

30246-90002 Getting Started with SNA Node Management
30246-90003 SNA Link Services Reference Manual