digital

Software Product Description

DESCRIPTION:

IAS is a general purpose operating system that runs on the PDP-11/45, PDP-11/50, PDP-11/55, PDP-11/60, or PDP-11/70 central processors. IAS supports three concurrent modes of processing: real-time, interactive, and batch. The system includes the PDP-11 MACRO assembler and optionally supports several language processors and data management systems. IAS provides:

- multiple concurrent processing modes to optimize system resource usage
- general interactive multi-language services for up to 32 simultaneous users
- an easy-to-use interactive and batch program development interface that operates concurrently with real-time processing
- operating system services that automatically share processor and memory resources among interactive application programs through time slicing and swapping
- program and data protection in system and user interactions
- interactive interface for the system operator to allocate system resources

IAS consists of elements of the RSX-11D operating system executive that provide real-time processing, and a timesharing executive that controls the interactive and batch processing facilities. Real-time, interactive, and batch processing can take place concurrently and service is normally delivered in that order of priority.

Memory is partitioned into areas controlled by the real-time executive and an area controlled by the timesharing executive. Tasks in real-time partitions are scheduled by priority, as in RSX-11D. The timesharing partition is used for interactive, batch, and non-critical real-time tasks.

The timesharing executive schedules interactive tasks using a dynamically computed time slicing algorithm. If necessary, the executive also swaps tasks in and out of memory from one or more swapping areas on disk.

The timesharing executive schedules and swaps batch tasks in the same manner as interactive tasks. Batch tasks normally receive the CPU time available after real-time and interactive tasks are serviced. It is possible, however, to guarantee a minimum amount of CPU time to batch processing.

IAS is oriented toward the interactive terminal user. Terminals are normally associated with a program called a Command Language Interpreter (CLI) that conducts the dialogue with the user and calls system services to carry out the user's requests. Two CLIs are included with the IAS system: the Program Development System (PDS) and the System Control Interface (SCI).

All real-time, interactive and batch facilities are available to the PDS user. The system manager can define privileges and assign passwords uniquely for each PDS user to control the facilities an individual is allowed to invoke. PDS:

- prompts user for command arguments and supplies default values
- provides access to multiple language processors, file system, utilities, and system status information
- accepts indirect command files for automatic command input
- enables user to submit batch command files
- conditionally executes commands in either indirect command files or batch streams based on error tests
- provides access to real-time program control commands

SCI is the system operator's terminal interface. It enables the operator to control system resource allocation dynamically, including the assignment of terminals to particular CLI's. For example, the system operator can declare programs other than PDS as the CLI associated with a terminal, e.g., the BASIC language interpreter. A user at that terminal can then invoke only that program and no other. SCI:

- can be invoked from any designated user terminal

- can be used to control allocation of resources to users and CLI assignment to terminals
- can be used to monitor system status and tune the system dynamically

PDS, SCI, and most other system programs provided with IAS are shareable and reentrant. Utility programs include:

- a complete set of file control utilities, such as file dump, file verification, volume preservation, disk save and compression, file comparison
- two editors: an interactive character-oriented editor and a line-oriented batch editor
- program development utilties such as the MACRO assembler, the Task Builder linker with automatic overlay support, and the on-line debugger which is linkable to individual tasks
- system generation program
- program library management program
- PLOT55 graphics subroutine for using graphics features of the VT55 terminal
- Linker (Task Builder) with automatic overlay support

Users writing their own CLIs or other application programs can call the Timesharing Control Services (TCS) for controlling and executing tasks and sub task. User-written interactive programs:

- can be multi-tasked and engage in event flag communication
- can be shareable, reentrant, and share common data areas
- can execute concurrently with other application tasks, be time slice scheduled and swapped

User-written Command Language Interpreters can also:

- run other tasks to multiple levels
- engage in inter-task communication using send/receive directives or "command lines"

Programs in all three processing modes have access to the IAS file system, which is compatible with the RSX-11 family of operating systems. Protection is separately controlled for four categories of user (system, owner, group, world) for four types of access (read, write, extend, delete). Magnetic tape labels are checked and ANSI standard magtape format is supported.

Other facilities are:

- spooling of output to printers and non-interactive terminals
- spooled batch input from record-oriented devices and from files submitted by users

- accounting information recorded for interactive and batch users showing CPU and memory usage and connect time
- automatic logging (on disk) of peripheral device errors and memory parity errors
- optional user mode diagnostic device exercisers for on-line checkout of peripherals
- block mode terminal support

MINIMUM HARDWARE REQUIRED:
One of the following processor systems with bootstrap, KW11 clock, console terminal, supported user terminal and at least 64K words of memory:

- PDP-11/45, 11/55, 11/60 with memory management unit (11/60 WCS not supported)
- PDP-11/70

One of the following mass storage packages:

- RK11 disk cartridge controller (includes one RK05J drive) and two additional RK05J drives
- RK611 disk pack controller (includes one RK06 drive) and one additional RK06 drive
- One each of the following disk and magnetic tape systems:
  Disks:
  1. RK611 disk pack controller (includes one RK06 drive)
  2. RPR11 disk pack controller (includes one RPR02 disk drive)
  3. RP11 disk pack controller (includes one RP03 disk drive)
  4. RJP04/05/06 (or RWP04/05/06 for 11/70) disk pack controller (includes RP04/05/06 drive)
  5. RWM03 disk pack controller (includes one RM03 drive)
  Magnetic Tape:
  1. One TU10, TE10, TU16, TE16 or TU45 with appropriate controller.

A 96K word PDP-11/70 system configured with an RP04, RP05 or RP06 drive is recommended for support of 10-12 terminal users executing both batch and interactive tasks.

The 64K word PDP-11/45 system is the minimum for supporting a two terminal system running either interactive or batch tasks. This system provides only a 20K to 24K word user area depending on which device handlers are memory resident.

OPTIONAL HARDWARE:

- Additional memory to a system total of 124K words on other than PDP-11/70 systems or 1920K words on PDP-11/70 systems.
- FP11 Floating Point Processor

- KW11-L or KW11-P clock, or DL11-WA/WB console interface and line frequency clock

I/O Peripherals:
- LA30, LA36, LT33, LT35, VT05, VT05B, VT50 terminal family
- PR11 paper tape reader or PC11 paper tape reader with punch
- CR11, CM11, CDA11-A or -E card reader
- CTS11 card reader/punch (available from Computer Special Systems)
- LA35, LS11, LA180, LA180S, LP11, or LV11 line printer (plotter not supported by operating system)

Magnetic Tape Devices:
- TA11 cassette system
- TC11 DECtape system
- TU10, TE10, TS07, TU16, TE16 and TU45 tape drives with the appropriate controller.

Disk Devices:
- RX11 floppy disk system
- RK11 disk cartridge system
- RK611 disc cartridge system
- RPR11 disk pack system
- RP11 disk pack system
- RJP04/05/06 disk pack systems (RWP04/05/06 for 11/70)
- RWM03 disk pack system
- RF11 fixed head disk
- RJS03/RWS03, RJS04/RWS04 fixed head disk systems

Communications:
- DL11 serial single line interface
- DJ11 serial line multiplexor
- DH11 programmable serial line multiplexor
- DM11-BB modem control multiplex for DH11
- DZ11 serial 8 line multiplexor

Laboratory/Industrial Control
- AD01 analog/digital converter
- AFC11 analog/digital converter
- UDC11 Universal Digital Controller
- IDA11-AA Contact sense module
- IDA11-AB Contact sense module
- IDA11-BA Contact interrupt module
- IDA11-BB Contact interrupt module
- IDA11-CA I/O converter
- IDA11-DA Solid state AC/DC driver
- IDA11-EA Flip-flop DC driver
- IDA11-FA Single shot driver

- IDA11-GA Latching output relay
- IDA11-HA Flip-flop output relay
- IDA11-JA Single shot output relay
- IAA11-AA Multi-range A/D converter
- IAA11-BA D/A converter
- IAA11-BB D/A converter
- IAA11-BC D/A converter
- IAA11-BD D/A converter

Data Acquisition:
- LPS11 Laboratory Peripheral System with LPS11-S, LPSAD-12, LPSKW, and LPSDR-A. Options:
  1. BA408 gain ranging option for LPS11
  2. LPSAM multiplexor expansion to LPSAD-12
  3. LPSAM-SG gain ranging option to LPSAM
  4. LPSVC digital/analog converters and display control
  5. LPSAM-E multiplexor expansion (requires LPS11-E in place of LPS11-S)

PREREQUISITE SOFTWARE:
None

OPTIONAL SOFTWARE:
The following software is available under a separate license agreement. (See appropriate SPD for specific requirements):
DBMS-11
BASIC-11/IAS-RSX
DECNET/IAS Network Software
PDP-11 COBOL
SORT-11
CORAL-66
FORTRAN IV/IAS-RSX
FORTRAN IV-PLUS
RMS-11K
ICS/ICR Handler
RJE/HASP
UN1004/RSX-IAS
MUX 200/RSX-IAS

TRAINING CREDITS:
Five (5) — Applies only to options that include support services. Consult the latest Educational Services Catalog at your local office for available courses, course requirements, and guidelines.

SUPPORT CATEGORY:
A — Software Support will be provided as stated in the Software Support Categories Addendum to this SPD.

UPDATE POLICY:

Software Updates, if any, released by DIGITAL during the one (1) year period following installation, will be provided to the customer for a media charge (includes no installation). After the first year, updates, if any, will be made available according to then prevailing DIGITAL policies.

ORDERING INFORMATION:

This software is furnished under a license for use on a single CPU and can be copied and modified (with inclusion of DIGITAL's copyright notice) only for use on such CPU, except as may otherwise be provided in writing by DIGITAL.

Standard options with no support services are only available after the purchase of one supported license. When a software license is ordered without support services, the category of support applicable to such software is Category C. A single-use license only ("D") option is a license to copy the software product previously obtained under license, and use such software in accordance with the licensing provisions of Digital's Standard Terms and Conditions of Sale. The category of support applicable to such copied software is Category C.

Source and/or listing options are only available after the purchase of at least one supported license and after a source license agreement is in effect.

The following key (D, E, R, T, Z) represents the distribution media for the product and must be specified at the end of the "Q" number, i.e., QR300-AD = binaries on 9-track magnetic tape.

D = 9-track Magnetic Tape
E = RK05 Disk
R = Microfiche
T = RK06 Disk
Z = No hardware dependency

Standard Options

QR300 -A— Single-use license, binaries, documentation and key source modules, support services (media: D, E, T)

QR300 -C— Single-use license, binaries, documentation and key source modules, no support services (media: D, E, T)

QR300 -D— Single-use license only, no binaries, no docomentation, no support services (media: Z)

Upgrade Options

The following options are available as an upgrade kit from RSX-11D for use on the same single CPU on which RSX-11D is licensed. The license previously granted for RSX-11D shall be extended to cover this upgrade.

QR303 -A— Single-use license, binaries, key source modules, documentation, support services (media: D, E, T)

QR303 -C— Single-use license, binaries, key source modules, documentation, no support services (media: D, E, T)

Update Options

Users of prior versions of IAS, whose specified Support Category warranty has expired, or whose Standard Program Update Service has expired, may order under license the following software update at the then current charge for such update. The update is distributed in binary form on the appropriate medium and includes no installation or other services unless specifically stated otherwise.

QR300 -H— Binaries, documentation (media: D, E)

Users of IAS whose specified Support Category warranty has not expired may order under license the following software update for the then current media charge. The update is distributed in binary form on the appropriate medium and includes no installation or other services unless specifically stated otherwise.

QR300 -W— Binaries, documentation (media: D, E)

Users who have a single use license only option may order under license the following license only update.

QR300 -H— Single-use license only (media: Z)

Source/Listing Options

QR300 -M— All program sources (media: D, E, T) plus listing on Microfiche

QR300 -F— All program source listings (media: R)

Source/Listing Update Options

The following options are available to licensed users as updates to source/listing options. The update is distributed in source form on the appropriate medium and includes no installation or other services unless specifically stated otherwise.

QR300 -N— Sources plus listings on microfiche update (media: D, E)

QR300 -N— Source listing update (media: R)

Miscellaneous Options

QR300 -G— Pre-delivery kit (media: Z)

ADDITIONAL SERVICES:

QR300 -3— Standard binary program update service for RK05 based systems (media: D, E)

QR304 -3— Standard binary program update service for RK05 based systems (includes service for FORTRAN IV/RSX, IAS) (media: D, E)

ADDENDUM
SOFTWARE SUPPORT CATEGORIES

Each software product (hereinafter 'SOFTWARE') with a designated Support Category A or B in the applicable Software Product Description (SPD) existing at the time of order will be the current release at the time of delivery and will conform to the SPD. DIGITAL's sole obligation shall be to correct defects (nonconformance of the SOFTWARE to the SPD) as described below. Any SOFTWARE with a designated Support Category C will be furnished on an 'as is' basis.

For SOFTWARE with a designated Support Category A or B, DIGITAL will provide the services set forth below without additional charge.

CATEGORY A

1. Upon notification by customer to the nearest DIGITAL office that the computer system, including all required prerequisite hardware and software, is ready for the installation of the SOFTWARE, DIGITAL will install such SOFTWARE in any location within the contiguous forty-eight (48) United States, the District of Columbia, or a country in which DIGITAL or a subsidiary of DIGITAL has a software service facility. The notification must be received by DIGITAL and the system must be ready for installation within thirty (30) days after the delivery of the SOFTWARE to customer or DIGITAL will have no obligation to install. Installation will consist of: (1) verification that all components of the SOFTWARE have been received by customer, (2) loading the SOFTWARE, and (3) executing a DIGITAL sample procedure.

2. During the ninety (90) day period after installation, if the customer encounters a problem with the current unaltered release of the SOFTWARE which DIGITAL determines to be a defect in the SOFTWARE, DIGITAL will provide the following remedial service (on site where necessary): (1) if the SOFTWARE is inoperable, apply a temporary correction (TC) or make a reasonable attempt to develop an emergency by-pass, and (2) assist the customer to prepare a Software Performance Report (SPR) and submit it to DIGITAL.

3. During the one (1) year period following installation, if the customer encounters a problem with the SOFTWARE which his diagnosis indicates is caused by a SOFTWARE defect, the customer may submit an SPR to DIGITAL. DIGITAL will respond to problems reported in SPRs which are caused by defects in the current unaltered release of the SOFTWARE via the Maintenance Periodical for the SOFTWARE, which reports SPRs received, code corrections, temporary corrections, generally useful emergency by-passes and/or notice of the availability of corrected code. Software Updates, if any, released by DIGITAL during the one (1) year period, will be provided to the customer on DIGITAL's standard distribution media as specified in the applicable SPD. The customer will be charged only for the media on which such updates are provided, unless otherwise stated in the applicable SPD, at DIGITAL's then current media prices.

CATEGORY B

During the one (1) year period following delivery, the services provided to the customer will be the same as set forth in 3 above.

CATEGORY C

SOFTWARE is provided on an 'as is' basis. Any software services, if available, will be provided at the then current charges.

DIGITAL shall have the right to make additional charges for any additional effort required to provide services resulting from customer use of other than current unaltered release of the SOFTWARE operated in accordance with the SPD.