PROIV Bus & Tasks

S/390 PRO*IV* Version 4.1

Release Guide

September 2000

EMEA

PRO***IV*** Ltd.
Kings Hall
Parsons Green
St Ives
Cambridgeshire
UK

Tel: +44 1480 494330
Fax: +44 1480 494039

THE AMERICAS

PRO***IV*** Software Inc.
Suite 200
101 Academy
Irvine
CA 92612

Tel: +1 949 823 1000
Fax: +1 949 823 1010

Internet: www.proiv.com

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MANUAL: S/390 PRO*IV* Version 4.1 - Release Notes, September 2000.

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Purpose of this Manual

This document lists modifications included in this release that correct or improve the operation of S/390 PRO*IV*. It also details features and enhancements that are new for this release of PRO*IV*.

Related Documents.

PROIV Developer's Guide
PROIV Developer's Guide to Logic
PROIV Administrator's Manual
S/390 PROIV Environment Guide
S/390 PROIV Installation Guide
S/390 PROIV Parameters & Defaults
PROIV Windows Client User Guide
PROIV Bus & Tasks User Guide

Introduction.

S/390 PRO***IV*** version 4.1 introduces new features that start to unlock the PRO***IV*** environment to other S/390 and non-S/390 based applications. These new features are based around two new concepts developed by PRO***IV*** called 'Bus and Tasks', which drive the new external interfaces into the S/390 PRO***IV*** product.

The PRO***IV*** Bus is a mechanism used to connect third party software to the PRO***IV*** kernel and is targeted particularly for use with PRO***IV***'s internal workflow interface supported by the new Task function type. The PRO***IV*** Bus is designed to provide an open interface to PRO***IV***, which can be used by any product that can be classified as PRO***IV*** Bus compliant. PRO***IV***'s WebAccess product, which is a tightly integrated middleware solution interfacing back-office business applications to the internet, provides a complete internet solution for S/390 based PRO***IV*** applications using the PRO***IV*** Bus architecture.

PRO***IV*** Tasks are a new construct that harness PRO***IV*** components and enable them to be called from other third party products or applications like workflow products. PRO***IV*** Tasks can be developed to closely reflect business units of work from a single callable component. The PRO***IV*** Task represents a collection of functions, linked together in the standard way, with the ability to receive and generate data for external calling applications. The new Task function is supported by a new set of bootstrap functions that will enable the developer to create and manage Task function definitions.

A simplified PRO***IV*** Bus interface is provided for other CICS or S/390 based applications, which again provides the external application with access to PRO***IV*** Task functionality.

The following diagram shows the components involved with a WebAccess internet solution for S/390 PRO***IV*** and also indicates the flow of information between the applications. The diagram also shows the new S/390 PRO***IV*** API and is followed by a brief description of the major components.

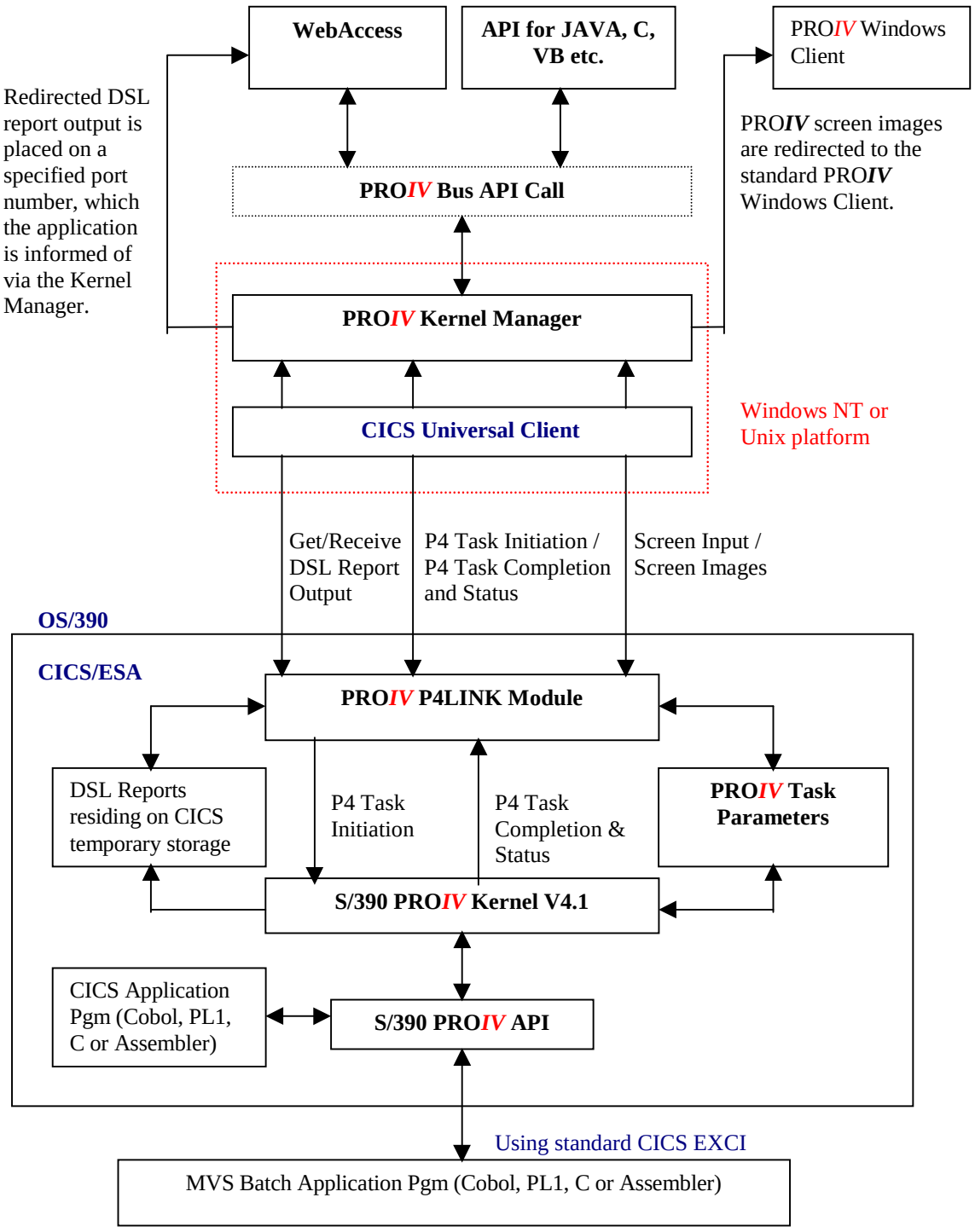


Figure 1. Diagram showing the external call interfaces into the S/390 PRO*IV* product.

PROIV Kernel Manager

The Kernel Manager provides communications from WebAccess or any other PRO***IV*** Bus compliant application, via the PRO***IV*** Bus API, to either a Unix based PRO***IV*** environment or in this case, an S/390 PRO***IV*** environment.

IBM CICS Universal Client

The CICS Client simply acts as a router to send an appropriate ISC call to the server CICS environment, attaching the COMMAREA built by the Kernel Manager.

PROIV P4LINK Module

The main functions of this software component can be summarised as follows:

- Receive and process an ISC request from a CICS Client.
- Invoke an S/390 PRO***IV*** Kernel to initiate a PRO***IV*** task.
- Pass back task status information to the Kernel Manager by using the CICS COMMAREA. This CICS COMMAREA may also contain a PRO***IV*** screen image.
- Receive and process requests from the Kernel Manager to obtain DSL report output from CICS temporary storage. The DSL data is passed back to the Kernel Manager via the 32K CICS COMMAREA.

S/390 PROIV Kernel

The S/390 PRO***IV*** kernel supports external communications with WebAccess and other PRO***IV*** Bus compliant applications along with CICS and non-CICS applications that use the new S/390 PRO***IV*** API.

With regard to CICS and non-CICS applications, the calling application should be able to build and interpret the API and be capable of processing DSL report output by issuing subsequent requests to retrieve DSL data that may be produced.

The P4LINK and the S/390 PRO***IV*** kernel act together to ensure all appropriate ASCII / EBCDIC translation is carried out on the CICS COMMAREA where a non-S/390 calling application is involved.

The PRO***IV*** Kernel also supports interactive screen processing for applications using the PRO***IV*** Bus and calling the Kernel Manager. The Kernel Manager sends and receives screen images via the CICS COMMAREA and will use the PRO***IV*** Windows Client to present the screens to the user.

System Requirements

For a WebAccess internet solution or non-S/390 PRO***IV*** Bus application the system requirements are as follows:

- S/390 PRO***IV*** version 4.1.
- PRO***IV*** for Windows NT version 4.6
- The latest PRO***IV*** GUI client.
- PRO***IV*** WebAccess version 2 or suitable PRO***IV*** Bus compliant application.
- CICS/ESA version 4.1 or higher.
- CICS Universal Client (Component of CICS Transaction Gateway).
- TCPIP connections for both host (OS/390) and client.
- Windows NT, 95 or 98 to operate the PRO***IV*** client on the workstation.

For access to the S/390 PROIV API only:

- S/390 PRO***IV*** version 4.1.
- CICS/ESA version 4.1 or higher.

New Features and Enhancements.

PRO*IV* Bus and Tasks.

PRO***IV*** Bus is an internal, high-speed, distributed channel that PRO***IV*** uses as a foundation for inter-process communication. The Bus is used to link the calling application to the PRO***IV*** Task that may be executed either on the same machine or on another network node.

Most of the complexity of managing this distributed interface is shielded from the applications programmer and the end-user by a set of well-defined application programming interfaces (APIs), collectively known as P4API. P4API provides access to Bus services for a wide range of programming and execution environments including C/C++, OCX (COM), Java, and Visual Basic. Programming details on the P4API can be found in the PRO***IV*** Bus and Tasks User Guide.

Using these interfaces, an applications programmer can easily integrate one or more PRO***IV*** functions (defined in a Task definition) into a native application written in any language that supports calling C compatible external functions, such as C, C++, or that supports calling OCX external function such as Java and Visual Basic. Once the Task is defined and published on the Bus, a user of P4API can call the Task from any network node (subject to security constraints) and execute it.

The PRO***IV*** Kernel Manager is responsible for matching incoming Task requests from users of P4API to available PRO***IV*** kernel resources. The Kernel Manager also acts as a conduit for passing control and status information between kernel and requester.

There are currently six types of messages that provide the communication between the Kernel Manager and the S/390 PRO***IV*** Kernel. An internal component of the Kernel Manager interprets and translates these messages accordingly and where appropriate build the CICS/ESA ISC call. The CICS COMMAREA then becomes the mechanism for transmitting the PRO***IV*** Bus to and from the S/390 PRO***IV*** kernel. The six message types can be summarised as follows:

- Request for Task execution.
- Task execution completion.
- Request for DSL report output.
- DSL report output.
- PRO***IV*** screen output.
- PRO***IV*** screen input.

It is important to note that the maximum size of the CICS COMMAREA is 32K, which although may be a restriction for data being passed back to the client application, it does not restrict the amount of DSL report output.

Before the PRO***IV*** Bus is transmitted to the S/390 environment, the PRO***IV*** Kernel Manager places additional information, specific to the PRO***IV*** CICS/ESA environment, at the start of the CICS COMMAREA before the normal PRO***IV*** bus structure. This information is obtained from configuring the Kernel Manager for S/390 PRO***IV*** and CICS/ESA communication and is detailed in the PRO***IV*** Bus and Tasks User Guide.

For non-S/390 systems, socket connections are used as the method of transferring requests and information between the components that make up the PRO***IV*** Bus. However, for the S/390 environment, IBM's Common Connector Framework or as in *figure 1*, the CICS Universal Client, which essentially allows non-CICS programs to access and update resources on CICS servers, will replace this.

PRO***IV*** Tasks utilise the PRO***IV*** Bus as a pre-requisite component and also introduce new bootstrap files to support Task definitions. Both the native PRO***IV*** bootstraps and the ProAide products provide basic Task management and development facilities to support the new function type:

Task definition
Copying tasks
Renaming tasks
Deleting tasks
Task documentation
Task import / export

In addition to specifying input and output parameters and a function list, the PRO***IV*** Task also offers the ability to specify a start function, an exit function and an error function as part of its definition. The Task error function in this case is invoked by any PROIV error condition and the normal Task exit function is bypassed. Detailed information on the new Task related bootstraps can be found in the PRO***IV*** Environment Guide.

One new PRO***IV*** system variable called '@task' has been created and contains the executing PRO***IV*** Task name (up to 32 characters).

PRO*IV* Bootstrap Modifications

PRO***IV*** Bootstrap modifications to support Tasks can be summarised as follows. The appropriate menu items can be found by selecting option 24 within @UMMF (which is linked to by @UM).

FILES:

DCTFTK	- This is a new DCTF queue used for the Import/Export of Tasks.	
TSKDEF	- This holds the definition of a Task.	
TSKMEMBR	- This holds the list of function within each Task.	
PARMS	- This holds the list of parameters listed for each Task.	
JOBDESC	- This holds the description of the Task, and any other appropriate information.	
TKJBXFIL	- This is the Import/Export file.	
UMSGLOG	- This points to the ESDS file which holds UMSG logging.	
UMSGLOGW	- This is the work file used to take info from UMSGLOG and display on a PROIV screen.	

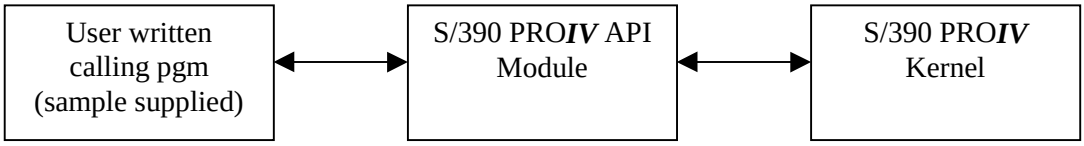
FUNCTIONS:

@TSKMENU	- This is the main menu where Tasks can be maintained.	
@TASKMNT	- This is the Task maintenance screen.	
@TSKLIST	- This function is used to display a list of Tasks.	(G)
@TSKDESC	- This function is used to edit the description.	(G)
@TASKCPY	- This function allows the user to select a Task to copy.	
@TSKCPY2	- This function updates the appropriate files for the chosen Task.	(G)
@TASKRNM	- This function allows the user to select a Task to rename.	
@TASKDEL	- This function allows the user to select a Task to delete.	
@TSKDEL2	- This function deletes from the appropriate files for the chosen Task.	(G)
@TASKDOC	- This function allows the user to select a Task to document.	
@TSKDOC2	- This report documents the chosen Task to screen.	
@TSKDOC3	- This report documents the chosen Task to a printer.	
@TSKVAR1	- This function shows a list of all variables associated with a Task.	(G)
@TSKLSTI	- Shows a list of Tasks available for Import from TKJBXFIL.	(G)
@DELTKLI	- This function deletes from the DCTFTK list if selected.	(G)
$XFRTSKI	- This function allows the user to build their list of Tasks for Import.	(G)
$XFRTSKE	- This function allows the user to build their list of Tasks for Export.	(G)
$XFRTKDI	- This function deletes from TSKDEF etc. before importing the Task.	

$XFRTKDE	- This function deletes from TKJBXFIL before exporting the Task.
$XFRTKIU	- This function updates TSKDEF etc. with the appropriate Task info.
$XFRTKEU	- This function updates TKJBXFIL with the appropriate Task info.
@UMSGLG1	- This allows the user to specify an alternate name (FCT entry) and function name (optional) to view UMSG history.
@UMSGLG2	- This is an update which takes the appropriate data and adds it to the work file.
@UMSGLG3	- This function displays the final results by reading from the work file.

S/390 PRO*IV* API.

A new API module is supplied with this release, which provides a callable interface for other CICS and S/390 based applications, which will help integrate the PRO***IV*** technology with existing S/390 based software.



The interface is again only designed for use with PRO***IV*** Tasks and offers the ability to pass external parameters into PRO***IV*** and extract appropriate data via the CICS COMMAREA. This interface is specific to the S/390 environment and is described in detail in the S/390 PRO***IV*** Environment Guide.

Support for Delimiter Separated List (DSL) Report Output.

This new version of PRO***IV*** is capable of producing Delimiter Separated List (DSL) report output from data located in DB2, DLI or VSAM, which can then be passed back to an external application. Data presented in this standard format can be easily processed and presented by other distributed applications and web-enabling components, such as PRO***IV***'s WebAccess product.

DSL report output is placed into CICS temporary storage queues for subsequent retrieval by the external calling application. The CICS COMMAREA used to signal task completion and that DSL report output has been produced, also contains the CICS Temporary Storage queue names that contain the DSL data.

If S/390 PRO***IV*** is invoked via the PRO***IV*** Kernel Manager, the Kernel Manager automatically issues subsequent requests to retrieve DSL output. However, if the S/390 PRO***IV*** API is used and DSL is generated, the user will need to create a mechanism to retrieve the DSL from the appropriate temporary storage queue.

DSL report output for a particular function can be specified by using the $SPOOL utility and coding the following information:

Field:	***Report Device Name.***	
Value:	API	Produces normal ‘report-style’ output.
	API:OUTFMT=D“%”	Produces DSL output, with “%” denoting the delimiter character. The “%” can be one or two characters and defaults to “,”.

Please note that if the $SPOOL option is specified incorrectly, the entry is ignored and report output will be directed to the CRT.

Euro Currency Symbol (€).

The S/390 PROIV kernel has been internally modified to recognize the EBCDIC and ASCII hexadecimal representations of the Euro currency symbol. This change enables the Euro currency symbol to be assigned to PROIV variables and used in PROIV reports, screens etc. However, it is important to note that for an installation to physically display this symbol on a screen or printed report, the appropriate levels of other system software and hardware will be required.

Advanced support for PRO*IV* Screen Functions.

Two of the new message types that are used between the S/390 PROIV Kernel and the Kernel Manager have been designed to support PROIV screen images being sent and received. The screens are presented by the PROIV Windows Client, which is required on the workstation issuing the original PROIV Bus API request.

UMSG Routing.

In order to provide some audit trail information for PRO***IV*** Tasks, three new run-time options are available to control user messages that may be generated during external calls to the product.

UMSGLOG Specifies if UMSG's are to be logged when processing PRO***IV*** Tasks. This only applies to 'Report' and 'Update' PRO***IV*** functions and if set to (Y)es, logging is directed to the file specified in the UMSGFLE option.

UMSGFLE Specifies the ESDS VSAM file name that contains the formatted UMSG information. This is only be used if the UMSGLOG option is set to (Y)es.

UMSGSCR Specifies if UMSG's are to be displayed to a screen when processing PRO***IV*** Tasks. This only applies to 'Report' and 'Update' PRO***IV*** functions and if set to (N)o, UMSG's are ignored.

A new bootstrap function, available from the PRO***IV*** Task menu, is provided to view the contents of the ESDS VSAM log file.

Code Page Run-time Options.

A new run-time option is provided to specify the code-pages to use for all ASCII/EBCDIC translation when processing PRO***IV*** Bus information received from a non-S/390 platform. This option also provides the ability to specify user supplied code-pages that should be used for this translation. Sample code is supplied to allow the user to build an object module containing their own code-page, which is then link-edited with a PRO***IV*** kernel module in order for it to be activated.

For further details on this option please refer to the S/390 PRO***IV*** Parameters and Defaults Manual (parameter = BUSPAGE).

New Product Security Key.

This release of the S/390 PRO***IV*** product is secured with a security key mechanism that verifies the CPUid of the S/390 machine the customer has registered with the PRO***IV*** Technical Support team.

The customer is required to register all S/390 CPUid's that are used for PRO***IV*** processing and in return PRO***IV*** will supply a security key in the form of a code modification (AMASPZAP).

A new SVC module is supplied with this new release, which enables the PRO***IV*** kernel to verify a security key issued to a customer.

AMODE 31 Processing for Batch.

The batch S/390 PRO***IV*** kernel has the capability to be link-edited with the attributes AMODE 31, RMODE ANY. This modification will help to eliminate storage constraints that accompany traditional 24 bit processing and therefore offer a potential performance benefit for S/390 PRO***IV*** batch processing.

PRO*IV* Functions in Batch.

A date and time stamp is provided for each function that executes in the batch environment in order to provide information on individual function performance during the execution of complex batch applications.

The new date and timestamp does not change the layout of existing messages so that current post-processing mechanisms of PRO***IV*** output can continue. The format of the date produced is determined by the PRO***IV*** runtime option 'DATFORM' and an example of the output that will now be produced is supplied below.

```
        10        20        30        40        50        60        70        80
----:----|----:----|----:----|----:----|----:----|----:----|----:----|----:----|
FUNCX                                                        mm/dd/yyyy hhmmss
REPORT IN PROGRESS - PLEASE WAIT
FUNCY                                                        mm/dd/yyyy hhmmss
```

Setting Condition Codes for Batch.

The batch PRO***IV*** kernel has been modified to produce a return code of 08 to the operating system in the event of any PRO***IV*** system error condition listed in the Messages and Codes section of the S/390 PROIV Environment Guide. However, a user-exit (written in Assembler) is supplied, which if link-edited with the batch kernel without modification, will ensure a zero return code is always presented to the operating system and therefore not affect any current subsequent condition code checking.

The supplied user-exit can also be used to access other internal PRO***IV*** parameters and therefore allow the user to control the termination of PRO***IV*** batch and the setting of the return code. Access is given to the following parameters:

PRO*IV* message number
Initial PRO*IV* function name
@RETCD (which can be set by the PRO*IV* application)
Job name
Step name
Step condition code

New SFINIT Option.

A new option for the SFINIT utility is now available to either add or remove the 'high-values' record, currently added as the default during file initialisation. The parameter 'PHYSICAL-EMPTY' should be specified if the high-values record is not required and further details of this option can be found in the S/390 PRO***IV*** Installation Guide and S/390 PRO***IV*** Environment Guide.

This should simplify file initialisation for our customers and provide some flexibility where the appropriate files are initialised by other mechanisms.

Enhanced Installation Procedures.

The installation process has been improved by the introduction of installation verification procedures for both the batch and online S/390 PRO***IV*** environments. Details of these procedures are supplied in the S/390 PRO***IV*** Installation Guide and will help the customer to ensure a complete and successful installation of the PRO***IV*** product.

S/390 PRO*IV* Bus & Tasks – Unsupported Features

Task Parameter Passing

There is a maximum size of just under 32 Kilobytes for the total size of the parameter string (expressed in length-prefixed stream format) and a limit of 250 bytes for each single parameter.

Logic Commands

The S/390 PROIV kernel supports the SESSION.MODE logic command, which can return the following values:

STANDARD	Online, interactive PROIV session under CICS/ESA.
BATCH	S/390 PROIV running in batch.
API	S/390 PROIV called from another CICS or S/390 based application via the PROIV supplied API module.
COMPONENT	S/390 PROIV called from a distributed application via the PROIV Kernel Manager component.

The logic commands APPLICATION.ABOUTBOX, CURRENTLS.ONETIME and TASK.EXIT are not supported by the S/390 PROIV kernel.

UMSG Logging

The S/390 PROIV kernel does support UMSG logging but there are differences in how this feature is implemented in the S/390 environment. Please refer to the New Features and Enhancements section earlier in this document for further details.

Logon to Link Functions

The S/390 PROIV Kernel does not support the execution of a *logon to link function* for the operator specified in the task execution request.

Client Support with the Kernel Manager

The PROIV Windows Client is the only client supported when using Tasks on the S/390 PROIV environment.

Event Reporting

The S/390 PROIV Kernel does not participate in specific PROIV Task event reporting. The CICS system log and the Kernel Manager event log should be used to view system level messages.

Pre-loaded Fields

This Unix PROIV screen feature is not currently supported on the S/390 PROIV Kernel.

PRO*IV* Version 4.1 Corrections and Modifications

Version 4.1 contains, as part of the source code, all the corrections and modifications introduced into Version 4.0 in the way of permanent/mandatory patches. These patches have been part of the regression test suite of Version 4.1 so customers can be assured that as long as the patches listed here have been applied to their version 4.0 kernel then there will be no differences in operation.

Version 4.0 Issues corrected.

Patch No.	Issue No.	Environment	Description
P4000501	008	DB2	Restores the FPIOA address for the SQLDA during dynamic SQL processing.
P4000502		DB2	Corrects loop counter control preventing possible S0C4 abends.
P4000503	026	CICS	Fix error message stating that PROTDOC could not be found when using CICS Transient Data queues. Patch also withdraws support for CICS/ESA releases older than version 3.
P4000504	028	CICS	Prevents sync-points being issued while spool file is open.
P4000505	021	ALL	Fixes issue with vertical totals in report functions, which caused ASRA abends when report output directed to the screen.

Performance and Resource Requirements.

Although this version of the S/390 PRO***IV*** product introduces some new executable modules under CICS, there will be no significant additional resource requirements on the S/390 host, with the PRO***IV*** kernel size only increasing by about 20K from version 4.0.

The resource requirements of the PRO***IV*** MFC Client remain the same, with about 4mb of storage required (including help files and standard bitmaps) and 670kb of memory at execution.

Please find below some benchmark statistics, which compare the relative performance of PRO***IV*** versions 4.0 and 4.1 to version 30005. The benchmarking statistics given below should only be used as a general guide as both volume and individual customer profiles may alter the direct comparisons given.

Summary of S/390 PROIV CICS Performance Benchmarks:

	CPU Time	I/O Count	Storage high water mark	Terminal I/O (characters sent/received)
S/390 PROIV V40005 (% change from V30005)	**-3%**	**+0.5%**	**+13%**	**-14%**
S/390 PROIV V4.1 (% change from V30005)	**-5%**	**+0.5%**	**+20%**	**-14%**

Summary of S/390 PROIV Batch Performance Benchmarks:

	CPU Time	EXCP Count	Service Units	Storage
S/390 PROIV V40005 (% change from V30005)	**+2%**	**+2%**	**+3%**	**+19%**
S/390 PROIV V4.1 (% change from V30005)	**+2%**	**+4%**	**+8%**	**+30%**

Compatibility with Version 3.0 and 4.0.

Imported functions that were written or modified with PRO***IV*** version 3.0 or 4.0 can be run in both 3270 or GUI mode within version 4.1, without the need for a 're-gen'. Applications can also be used simultaneously in versions 3.0, 4.0 and 4.1 although once'genned' in version 4.0 or 4.1, they can no longer be run in version 3.0.