

RISE

An RPG Interactive System Environment for Program Development

Gary Ow
Hewlett-Packard
Information Networks Division

I. ABSTRACT

RISE is a specialized editor dedicated to the creation and modification of programs written in RPG. Its ultimate purpose is to significantly increase RPG programmers' productivity by presenting a single, friendly user interface to a development environment in which a user may easily edit source code as well as compile, prepare, and run the program. This paper will discuss some of the key features of RISE such as the visual forms that represent the RPG Specification Record forms and direct screen editing.

II. INTRODUCTION

RPG is a computer programming language in a class of its own. Some programmers boast of never using it, others are embarrassed to admit using it, while there are those individuals who are proud of using it. Whatever personal opinion these programmers may have, they all must admit that RPG can very effectively accomplish their data processing tasks no matter how complex.

RPG has proven to be extremely successful in the commercial data processing market. It is a higher-level specification language and, as such, it is very practical and easy to implement applications quickly. Simple notation provides easy management of complex I/O operations. Specifically, Hewlett-Packard's RPG/3000 offers automatic interfaces to Image, V/3000, and KSAM which are often crucial elements in a commercial application.

Although the language appears to be perfect for commercial processing, it has one major flaw . . . its column dependent syntax leads to tremendous difficulties during program creation and modification.

RPG programmers are all too familiar with these difficulties. But no longer must they fight these problems, sitting through long, tedious program development sessions, because now they have RISE.

RISE presents RPG programmers with a single working environment in which they may easily edit RPG source code using special forms that resemble the RPG Specification Record forms to alleviate column counting and confusion. Furthermore, RISE allows users to compile, prepare, and run programs as well as execute

many MPE commands and execute any program file. RISE enhances the power of RPG, eliminating RPG's syntactic flaw, providing a friendly user interface. RISE is totally dedicated to RPG users as illustrated in the next section.

III. RISE

The RPG Interactive System Environment offers these features:

- Visual editing with images that represent the RPG Specification Record forms.
- Command menu and special function keys (softkeys) for a broad range of uses.
- Page-at-a-time direct screen editing.
- Ability to call the RPG compiler as well as the Segmenter and manipulate the compiled listing using a split screen.
- Choice of editing a file directly or editing a copy of that file.
- Ability of execute MPE commands and run any program file.
- Help facility.
- Ability to create a comment banner in which a user may type documentation.
- Renumbering command which also allows a user to renumber the lines of the RPG source program in columns 1-5.
- Add mode which allows a user to change RPG Specification Record forms, and to DELETE, LIST, or MODIFY lines while in Add mode.
- Recoverability feature to restore deleted lines.
- Automatic instructive guided tour to quickly acquaint a new user with the system.

Together, these features have been carefully integrated into RISE, resulting in a productivity tool essential to all RPG programmers.

Friendliness and powerful capabilities were guiding principles in design. The following example illustrates one of RISE's friendly aspects. When RISE detects an error in the user's entered command, it tries to return an error message which describes what exactly is wrong and possibly how to correct it. For instance, if a user entered just the letter "C", RISE will respond "Can't

distinguish CHange, COMment, or COPy command". This message is far more informative than the usual "Unrecognized command" message.

The following is a summary of all commands which RISE offers:

- | | |
|-----------------|--|
| 1. ADD | —add new lines |
| 2. BEGIN | —start editing a new file |
| 3. CHANGE | —change oldstring to newstring |
| 4. COMMENT | —create a comment banner |
| 5. COPY | —duplicate lines |
| 6. DELETE | —delete lines |
| 7. EXIT | —end system |
| 8. FILE | —edit file directly |
| 9. FIND | —locate a string |
| 10. FORM | —display an RPG Specification Record form |
| 11. GET | —execute commands from a file |
| 12. HELP | —explain commands |
| 13. INCR | —set default increment value |
| 14. JOIN | —append or merge a file |
| 15. KEEP | —save the work file |
| 16. LINE | —enter Line Mode |
| 17. LIST | —list lines |
| 18. MENU | —display Command Menu |
| 19. MODIFY | —modify lines |
| 20. MOVE | —transfer lines to new location |
| 21. PRINT | —print lines offline formatted |
| 22. RENUM | —renumber editor sequence numbers or RPG source line numbers |
| 23. RUN | —run a program file |
| 24. SHOW | —display a page for direct screen editing |
| 25. TEXT | —edit copy of a file |
| 26. UNDEL | —restore last deleted lines |
| 27. VERIFY | —compilation or preparation |
| 28. XPAND | —expand the work file size |
| 29. :MPEcommand | —execute MPE command |

However extensive a user's experience is, however technical the job at hand, with this full command set a user may easily direct RISE to accomplish editing and data processing goals.

IV. KEY FEATURES OF RISE

RISE offers a multitude of features dedicated to the development and maintenance of RPG source code. In this section, a presentation on some of RISE's major features is given.

RPG Specification Record Forms

Part of RISE's user interface consists of a communication system which utilizes special forms that are equivalent to the "RPG Listing Analyzer." Using graphic guides, these forms explain the semantics of every column so that the RPG source code is understandable as well as easy to edit. This eliminates confusion and extensive column counting.

When creating new source lines, a user may direct RISE to display any of the RPG Specification forms, and when modifying existing lines, RISE will automatically display the appropriate form with the line for modification.

Add Mode

RISE offers an Add Mode similar to Edit/3000 to allow a user to enter new text. However, RISE's Add Mode is significantly spiced up to more thoroughly meet the user's needs of source code creation.

While in Add Mode, a user may perform any of the following operations:

1. Change RPG Specification Record forms
2. Display a column indicator form
3. Enter the DELETE, LIST, or MODIFY command
4. Direct RISE to prompt for new text starting at column 6 instead of 1 to skip over the entering of the optional RPG line numbers in columns 1-5

The ability to enter the DELETE, LIST, or MODIFY command while in Add Mode is often very valuable and time-saving. For instance, suppose a user is entering new source lines and discovers that the previous line was entered incorrectly. No problem . . . for the user may immediately access the line and modify it and simply continue on with the additions. This is all accomplished without the user switching out and back into Add Mode which can be quite bothersome.

Modify Mode

Moreover, RISE offers a Modify Mode for interactive line editing similar to Edit/3000 but with added improvements. The first improvement is that the record to be modified can be automatically displayed with its associated RPG Specification Record form for guidance while editing. Another is a recovery feature which allows a user to type Control-Y to restore the record in the form before any modifications were made to it. Finally, the last improvement was implemented for visual consistency. Unlike Edit/3000, when RISE displays a record for modification, it appears formatted on the screen exactly as records created in Add Mode and records listed with the "LIST" command appear. In other words, the line number will always appear to the left of a record whenever a user creates it, modifies it, or lists it.

Show Mode

RISE's Show Mode displays an RPG Specification Record form at the top of the screen followed by a page of RPG source code in Block Mode for direct screen editing. A user need only use the terminal's cursor control keys to position the cursor on the page and directly type in the changes. The user could also depress the Tab key to quickly skip across the source record to important columns of interest.

With this feature, the editing procedure is tremendously simplified for what is visible on the screen will

duplicate what is stored in the file so that "what you see is what you'll get."

The special function keys or softkeys are also integrated into Show Mode, giving the user even more flexibility. Descriptive softkey labels appear at the top of the screen to inform the user of the function of each softkey. Some of the functions performed by the softkeys are variations on scrolling such as Scroll Forwards, Scroll Backwards, Scroll to First Page, and Scroll to Last Page.

With this scrolling power, a user could page through the file, making any necessary changes directly on the screen. The RPG Specification Record form will automatically change on the screen whenever the next form type changes.

Help Facility

Like all high quality, interactive software systems, RISE includes a Help Facility which provides a summary of all commands and detail descriptions of each command. Each detail description shows a command's syntax, explains its operation, and gives examples.

Command Menu

Besides entering commands to RISE based on syntax rules, a user may select the next command to be executed with a "Command Menu." The Command Menu displays the options for a command so that a "fill out the blanks" on the menu to express the next command, ignoring the syntax rules. This is added convenience since the menu also functions as an implicit help guide by documenting the parameters of a command, proving beneficial to new users.

Some Useful Commands

Other than just the normally expected editing commands supported in standard editors such as the COPY, MOVE, FIND, and CHANGE commands, RISE offers three additional commands designed for user convenience and deletion recovery.

The COMMENT command will create a comment banner composed of a rectangle of asterisks to be placed anywhere in the user's source code. The banner is displayed in Show Mode, allowing a user to directly type in documentation on the screen within the banner. Because this feature makes documentation of source code less troublesome, it will encourage programmers to more thoroughly perform this task.

The RENUM command not only renumbers the sequence numbers of the file being edited, but it also can renumber the RPG line numbers of the source code in columns 1-5 so that a user never has to type in the numbers.

Finally, the UNDEL command will restore all lines that were deleted by the last DELETE command, protecting a user from accidental or erroneous deletions.

This feature, at times, can save many hours of work lost due to incorrect editing actions.

Compilation, Preparation, and Execution

Within the RPG Interactive System Environment, a user may compile, prepare, and execute the program to ensure its compile-time and run-time correctness. With this ability to invoke the RPG compiler, a user could immediately catch all compilation errors without having to switch back and forth between the operating system and RISE.

After compiling a user's program, RISE will automatically manage the compilation listing so that a hard copy listing need not be printed. By pressing softkeys, a user could scroll through the listing at the terminal, page by page, for inspection. Moreover, RISE has a unique capability to allow a user to view the listing in a split-screen mode, displaying two different portions of the listing at once. By pressing a softkey, a user could split the screen into a top and bottom portion and scroll either. Essentially, a user could simultaneously have two "windows" to view the compilation listing. In this fashion, a user may display the compiled source code in the top window and the compiler generated error messages in the bottom window.

Actually, RISE can do this automatically for a user. By simply depressing the "Find Error" softkey, a user can direct RISE to automatically locate the next source line in error and display it in the top window along with its corresponding error message displayed in the bottom window. Using this powerful feature, a user could quickly locate problems in the source code and correct them all while in the same development environment.

After developing the RPG program to compile successfully into a USL file, the user may command RISE to prepare the USL file into a program file. To accomplish the preparation, RISE invokes the Segmenter.

At this stage, before executing the program file with RISE's RUN command, the user may issue any file equations necessary for the proper runtime execution of the program using RISE's ":MPEcommand". Finally, the user is all set to execute the program.

Incidentally, a user may execute any program file within RISE such as the system utilities FCOPY and SPOOK.

RISETOUR

Another instructive feature is RISETOUR which is a self-paced, interactive, guided tour of RISE most beneficial to new users. Generally, it is always very difficult for a new user to become accustomed with a new interactive software package. However, in the case of RISE, a user could sit down at a terminal and RISETOUR will guide the user through the major features of RISE, giving demonstrations, explanations, and diagrams. This gives a new user first hand experience with a new product, easing the learning process so that the user may become competent with it more quickly.

V. CONCLUSION

RISE presents RPG programmers with a single, coherent program development environment dedicated to their production needs. The RPG Specification Record forms allow users to edit their source code in a friendly and easy manner. Direct screen editing further simplifies the editing procedure. The ability to generate comment banners encourages more thorough documentation of the source code. An online Help Facility, Command Menu, and RISETOUR all effectively acquaint new users to the system. The ability to compile

the program with automatic management of the listing in split-screen mode detects errors immediately for correction. And finally, the ability to issue many MPE commands as well as execute any program file is a passage way to other utilities from RISE.

Together, these features and many more have been smoothly integrated into a productivity tool vital to all RPG programmers. They can finally "rise" out of their confusing, tedious, and time-consuming development problems using the RPG Interactive System Environment.