

PLI1 (BS2000) Version 4.2 PL/I Compiler (optimizing) and Runtime System

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Pages 2

PL/I is a problem-oriented, general-purpose programming language suitable for both commercial and technical/scientific applications.

The language scope of the PL/I compiler PLI1 largely conforms to ISO Standard 6160 of November 1978 and the identical ANSI Standard published in 1976 as well as DIN Standard 66255 of May 1980.

The PLI1 compiler has significant optimization characteristics. PLI1 makes it possible to use the compiler in the shareable mode and to generate shareable object programs.

The PLI1 compiler can generate objects which are executable in XS addressing mode. When objects are generated in XS addressing mode, object code and data can be stored in the expanded address space.

Interactive symbolic debugging is possible with the help of the AID (Advanced Interactive Debugger).

PLI1 object modules created by the PLI1 compiler must be converted to executable load modules by being linked to the PLI1 runtime system PLI1-LZS.

The compiler and the pre-linked runtime system are DSSM-compatible.

Functional Description

Input/Output:

- GET/PUT DATA: Simple control of input/output of names and values of variables.
- Sequential access to REGIONAL files.
- CONSECUTIVE: files also with ISAM access method (in addition to SAM).
- Record and stream I/O are also implemented for system files.
- Variable:
- Dimensioning arrays and areas using variable, * (= reference to existing definition) and REFER (=self-defining, variable).
- VARYING: processing of bit and character strings with variable actual length.
- Processing complex sizes.
- Statements:
- BY NAME - structure allocation:
- Allocation of two structures to each other, provided the elements of both structures have the same name.
- DEFAULT - statement:
- Modification of attributes preset by the system.
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- Declarations:
- GENERIC attribute:
- Call (selection) of various subprograms via a shared (generic) input.
- LIKE attribute:
Copy attributes of an existing, defined structure declaration into another structure.

- Structures can be dimensioned to any level.
- Multiple functions for processing character and bit strings e.g. AFTER, BEFORE, DECAT, COLLATE, TRANSLATE, REVERSE, VERIFY, VALID.
- Generation of reentrant programs (OPTIONS REENTRANT).
- INITIAL attribute with CALL.
- BACKWARDS attribute for magnetic cartridge files.
- Variable sentence lengths for REGIONAL(3) access method.
- SCALARVARYING environment attribute to support variable sentence lengths in locate mode.
- Language elements:
- SELECT, LEAVE, DO UNTIL,
- ATTENTION condition,
- TRANSIENT files (via TIAM),
- Environment details LEAVE, UNLOAD, GENKEY, LIMCT,
- Built-in functions ANY, ALL, EVERY, SOME, POLY, CURRENTSTORAGE, STORAGE, PLI1GLOBAL,
- B- format with radix factors,
- User CONDITIONS also INTERNAL.

Program Description

PLI1 is made up of a compiler and the runtime system; the runtime system includes English and German text files (error messages).

Optimization:

PLI1 executes the following optimization of object programs etc.:

- Loop optimization: linear index strength reduction, extraction of loop-invariant expressions, optimization of register use, optimization of implicit loops.
- Elimination of multiple calculation of the same (sub-) expressions (combining of expressions).
- En bloc initialization of dynamic variables.
- optimization of register use on the basis of global information.
- Simplification of expressions.
- REORDER optimization.
- optimization of logic expression calculation.
- optimization of entry and return codes of specific internal procedures (quick procedures).
- In-line resolution of specific built-in functions.
- Special case optimizations.

Control statements:

Compilation and execution of PL/I programs can be easily controlled by options and modified to various stored application instances.

Pre-settings exist for all options which can be redefined by the user.

The compiler and objects can be controlled via the SDF command interface.

Diagnosis and debugging aids:

PLI1 offers specific tools for detecting and correcting errors when compiling and debugging programs:

- Clear error reports in German or English.
- Comprehensive source, cross-reference and attribute lists; offset and assembler list, structure length list.
- Memory dumps and easy output of variable names (PUT DATA).
- Dynamic verification of index limits, lengths of character and bit strings etc.
- Statement localization in response to errors and log of call interleaving.
- Various traces (fault trace) can be switched on/off dynamically.
- Controller events (check points) can be activated/deactivated dynamically.

PLI1 runtime system PLI1-LZS:

The runtime system includes the set of all ready-made components of an object program and program framework, input/output system, built-in functions, condition and error handling etc. The linkage procedure combines all link modules named when the linkage editor is called and also those which are referenced explicitly or implicitly by the named modules. Object modules are referenced explicitly for which declarations (DCL...ENTRY EXTERNAL;) occur in the respective module concerned providing the declaration does not also contain OPTIONS (WXTRN). In contrast, modules in the runtime library as required for conversion, input/output etc., are referenced implicitly.

Two runtime systems are available:

Elementary runtime system:

With the elementary runtime system all elementary link modules are available individually. A complete link and load procedure is required for each source program. A link log is generated during the linkage.

Prelinked runtime system:

With a prelinked runtime system, most elementary link modules are prelinked to two main modules.

All modules except ITP2SRT#, ITPLXFC#, ITPLXEN# and ITPLXFV# are programmed "reentrant".

Input/output access methods:

PLI1 supports SAM, ISAM, PAM and BS2000/OSD system file access methods.

SORT interface:

Using a CALL interface, PLI1 programs can call BS2000 SORT and either transfer or import data.

Reusability:

An option exists to reuse the compiler and runtime system and to generate object programs which can be reused.

openUTM interface:

openUTM (Universal Transaction Monitor) means transaction applications can be simply executed in BS2000/OSD and provides transaction-oriented administration of operating resources, application programs, data stations, primary and secondary data areas.

openUTM guarantees that a transaction has been executed completely or not at all with all relevant data modifications and guarantees the consistency of the application data.

Symbolic debugger tool AID

PLI1 generates debugger tool information for the symbolic debugging using the interactive debugging tool AID (Advanced Interactive Debugger) which is independent of the programming languages. This permits the symbolic display and setting of variables (symbolic dump) and symbolic trace. The debugging information is generated independently of a compiler option.

Technical Data

Hardware

Business server with /390 architecture

Business server with RISC architecture (SR2000)

Software

BS2000/OSD-BC as of V1.0

OSD-SVP as of V1.0

Optional software requirements:

AID for symbolic debugging

Operating mode

Batch and interactive mode

Implementation language

PL/I and Assembler

User interface

Commands: English

Messages texts available in either English or German

Installation

For advice on installation refer to the relevant Release Notices.

Documentation

Documentation in German and English:

Sprachbeschreibung für PLI1

Language Description for PLI1

Benutzerhandbuch für den PLI1 Compiler

User Guide for the PLI1 Compiler

Benutzerhandbuch Testen mit AID

Debugging with AID User Guide

Demands on the User

Knowledge of the programming language PL/I and of BS2000/OSD

Training

See course offer at:

<http://www.fujitsu-siemens.com/training>

Conditions

This software product is supplied to the customer under our conditions against a single payment or installments.

Warranty

Class: A

Delivery format: Machine language

Ordering and Delivery

This software product may be obtained from your local Siemens Nixdorf regional office.