

# plus<sup>+</sup>Pack

Enterprise Batch  
& DevOps Tools

JCLplus<sup>+</sup>

JCLplus<sup>+</sup> Remote

JCLplus<sup>+</sup> DevOps  
ToolChain Pack

JCLplus<sup>+</sup> Dev Plug-in

JSLplus<sup>+</sup>

XREFplus<sup>+</sup>DBr

SEA<sup>TM</sup>

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# plus<sup>+</sup>Pack

## ENTERPRISE BATCH & DEVOPS TOOLS

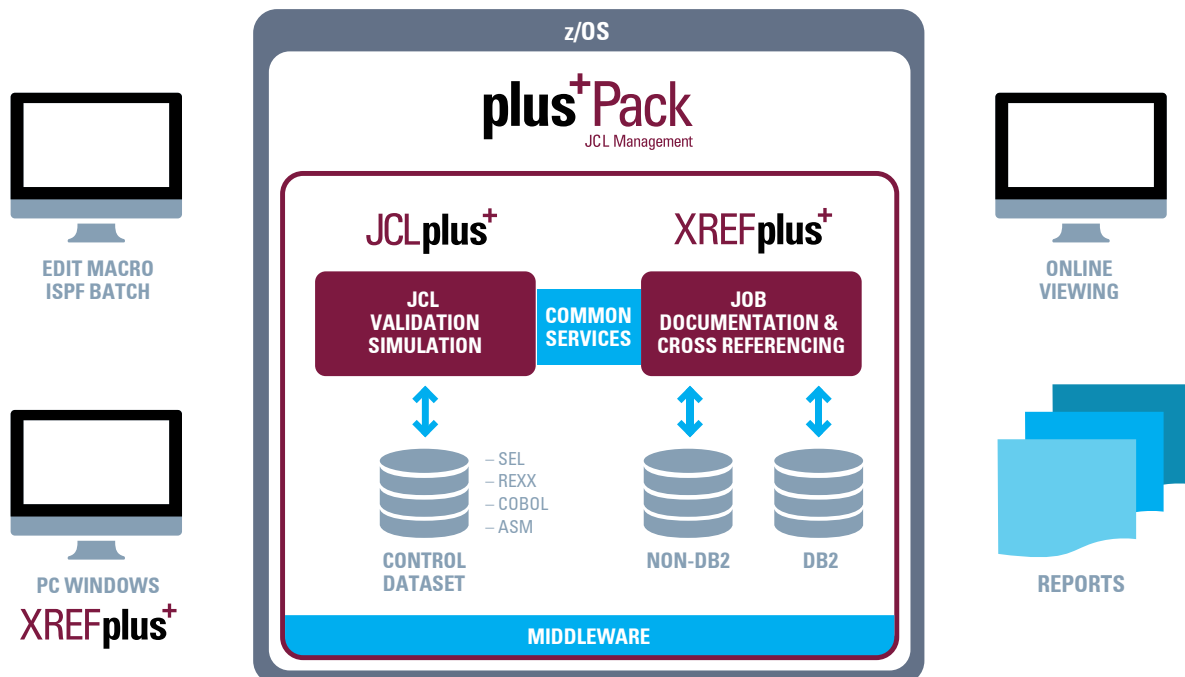
The goal of JCL management is to ensure that your JCL assets effectively support IT Service Delivery. Making sure that your JCL is defect-free, conforms to in-house standards and allows for easy maintenance is an ongoing process. In today's globalized economy, with shrinking production windows and multi-platform IT Services, there's little, if any, room for error in production batch cycles. plus<sup>+</sup>Pack provided by SEA helps organizations build test cases in line with agile development.

## INCREASED RELIABILITY THROUGH COMPREHENSIVE JCL MANAGEMENT

plus<sup>+</sup>Pack provides you with the necessary tools, documentation and support you need for cost-effective JCL asset management. JCL Syntax Checking and Run-Time Simulation.

- Support for Leading Job Schedulers and other widely used system/subsystems and IBM utilities
- Cross-system JCL testing
- Integration with Change Management Products
- JCL Editing and Reformatting
- Flexible Modes of Operation, including ISPF, Batch, Eclipsed-Based and VS Code Plugins
- JCL Intelligent Editing
- Comprehensive JCL Reporting and Documentation
- Modernizing JCL management using Web User Interfaces (Web UI) and RESTful APIs
- Enhanced DevOps Tooling, Integrated Development Environments (IDEs), and Java Batch plug-ins for streamlined efficiency and collaboration

## plus<sup>+</sup>Pack architecture



# JCLplus<sup>+</sup>

## JCL SYNTAX CHECKING & RUNTIME SIMULATION

Detecting JCL Syntax and runtime defects before they occur is your first key to a successful JCL management strategy. A one-character syntax error, a missing dataset or an unexpected security violation can cost hours of lost production time and daily online uptime disruptions. JCLplus<sup>+</sup> prevents these errors by providing a comprehensive runtime simulation engine.

## JCL STANDARDS ENFORCEMENT

Enforcing JCL coding practices, naming conventions and resource utilization increases productivity by improving reliability, reducing outages and protecting investments made in JCL optimization projects. JCL standards also enable automation and repetitive tasks, to seamlessly integrate with various workflows.

Standards enforcement rules can also be written using a fast-speed proprietary language such as SEL, REXX, Cobol, or Assembler, or Java in the case of Java Batch.

## JCL EDITING

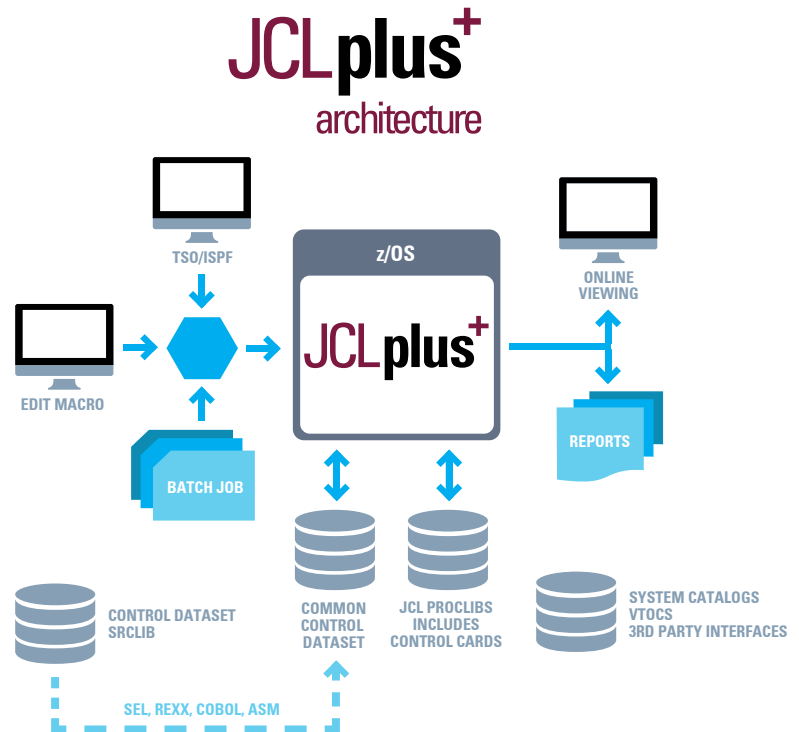
JCL reformatting is important for improving readability, consistency, ease of maintenance, facilitating documentation and compliance, and most importantly, to support automation. JCLplus<sup>+</sup> automatically reformats your JCL to your own specifications by using a high-level statement model. An entire JCL library can be quickly and easily reformatted eliminating numerous hours of hand coding.

## JCL FORMATTING

Clearly and consistently formatted JCL is critical to being able to spot errors and omissions that, if left undetected, could be costly. Well-formatted JCL also allows you to understand your JOBS and PROCs at a glance for increased productivity. JCLplus<sup>+</sup> automatically reformats your JCL to your own specifications. An entire library of JCL can be quickly and easily reformatted eliminating numerous hours of error-prone hand coding.

## JOB SCHEDULING

To meet critical batch-window requirements, data centers employ job schedulers that often add yet another level of complexity to JCL management. Systems like IWS, Control-M, ESP Workload Automation, Zeke, CA-7 Workload Automation and others, allow your JCL to contain intricate strings of proprietary or non-standard variables and directives that are typically resolved at job submission time. JCLplus<sup>+</sup> supports a wide range of scheduler systems, by resolving job scheduler symbolics and directives, enabling true JCL DevOps testing management.



### CHANGE MANAGEMENT, TMS, DASD & SECURITY

The infrastructure of an enterprise data center embodies an intricate network of system components such as tape, security, DASD and change management systems. plus<sup>+</sup>Pack is engineered to support and interface with all packages that may in any way impact your batch environment.

### IDE-READY

An Integrated Development Environment (IDE) such as the IBM developer for z/OS® (IDz) or BMC AMI DevX Workbench for Eclipse, provides development facilities to create, test and maintain z/OS applications in a GUI desktop environment. JCLplus<sup>+</sup> DevOps ToolChain Pack enables developers to seamlessly integrate to the plus<sup>+</sup>Pack legacy stack using plugins or programmatically via RESTful API and CLI client interface.

### JAVA BATCH & DEVOPS TOOLING FOR BATCH MANAGEMENT

plus<sup>+</sup>Pack introduces Java Batch processing into JCL mainframe development. Organizations can utilize the skills of their existing Java developers who are more widely available than mainframe programmers. Java Batch also provides a more modern, flexible and scalable approach to batch processing tasks, allowing organizations to process large volumes of data and function more efficiently.

### TECHNICAL SUMMARY

Engineered for high-speed, accurate syntax checking and cross platform needs, the JCLplus<sup>+</sup> product is an ideal component of your total JCL management solution.

### THE MOST THOROUGH JCL SYNTAX CHECKING AND RUNTIME VALIDATION AVAILABLE

It's the most subtle errors that are the most costly!

- Supports all z/OS keywords
- Supports user-defined rules for standards enforcement
- Resolves all symbolics
- Interfaces with all widely used data center software utilities
- Expands PROCs and INCLUDE groups
- Leading edge integration / emulation of scheduling symbolics / directives
- Finds common allocation errors
- Comprehensive validation of sort parameters

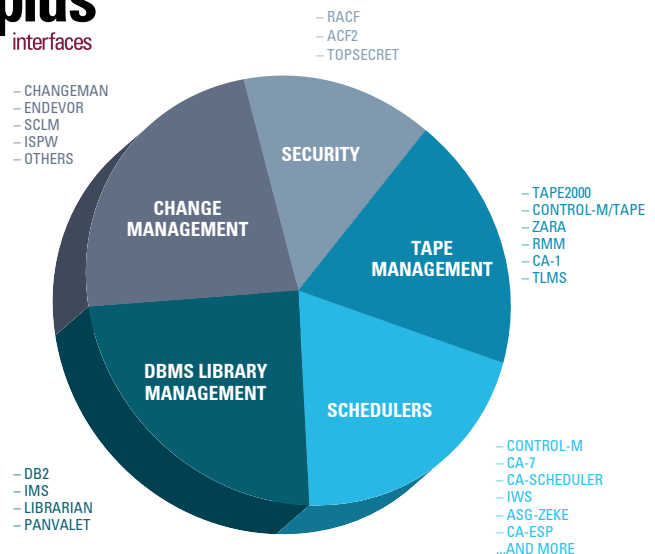
### JCL MAINTENANCE

- Reformats and reorders JCL to user specifications
- Intelligent update utility for global changes
- Compare utility for JCL and source files displays differences side by side and in context
- Simple yet robust rules language automates conversion to/from Test / Prod standard

### FLEXIBLE MODES OF OPERATION

- Runs as an ISPF Edit macro, as well as batch
- Intuitive TSO/ISPF panels
- Multiple exit points for maximum flexibility
- Easily interfaced to SCM processes to improve process automation
- IDE-ready with JCL DevOps ToolChain Pack and JCLplus<sup>+</sup> Dev Plug-in

**JCLplus<sup>+</sup>**  
interfaces



### REPORTING AND METRICS

All of the well-known best practices frameworks including ITIL, CMMI and Six Sigma stress the importance of reporting and metrics in managing process maturity.

JCLplus<sup>+</sup> embraces this requirement by providing automated creation, collection and reporting of JCL metrics to manage process maturity and validate investments made in your JCL products and Best Practices:

- Are the same problems reoccurring?
- What are the metrics (ROI) on problems avoided and time saved because of your adopted best practices?
- Are your developers taking advantage of the tools and processors you offer?
- How are you trending and what proactive actions can be taken?

### INCREASED PRODUCTIVITY

The SEA combination of JCLplus<sup>+</sup> with the best vendor JCL expertise available offers the highest level of automation possible and focuses on addressing Batch and JCL-related issues most important to you.

# JCLplus<sup>+</sup> Remote

## MANAGING JCL IN COMPLEX ENVIRONMENTS

Most sites run multiple z/OS images: one image for development, another for testing new software and one or more production images.

In many cases, production JCL runs on any number of images that don't share resources. While it is no longer sufficient to validate JCL solely on the machine on which the JCL resides, it can be complicated and costly to manually validate JCL in all the environments it will run.

## CHECKING JCL ON REMOTE MACHINES

JCLplus<sup>+</sup> Remote simplifies managing JCL in complex environments. It allows JCL that resides on one image to be validated on one or more remote images.

For example, the JCL for a JOB and several associated PROCs might be on a development image where changes are made to the PROCs and the JOBS. The changes all work in the development environment, but there is no way to be sure they will not cause JCL errors in the production environment.

With JCLplus<sup>+</sup> Remote, you can validate the JOBS and PROCs in the production environment from the development environment, with all the security controls in place, eliminating any scripting associated with file transfer and report routing.

JCLplus<sup>+</sup> Remote can streamline JCL processing, save time and resources, & reduce JCL defects in multi-image environments

- A single JOB
- Individual PROCs
- Multiple JOBS
- Multiple PROCs
- One or more JOBS and include local PROCs and control card members used by the JOBS
- One or more PROCs using one or more JOBS that already exist on the remote system

## INTEGRATION WITH CHANGE MANAGEMENT

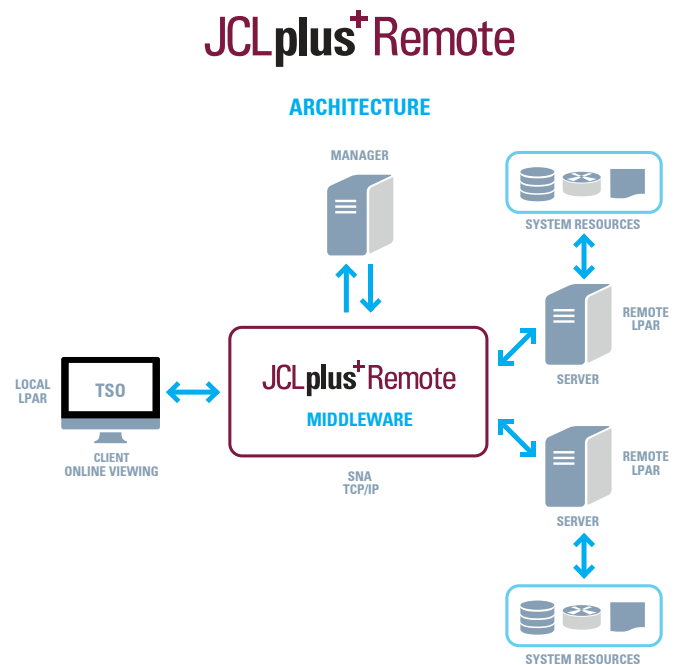
JCLplus<sup>+</sup> Remote integrates easily with change management processes to ensure the quality of JCL packages in their different stages of the lifecycle.

## SECURE OPERATION

Access to all JCLplus<sup>+</sup> Remote features and operations can be controlled and restricted at the user level. All inter-component communications can be encrypted. Nine levels of encryption are supported. In addition, all data transfers can be compressed to conserve bandwidth.

## PRODUCT INTEGRATION

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# JCLplus<sup>+</sup> DevOps ToolChain Pack

## CI/CD BATCH TESTING FOR IBM Z & MAINFRAMES

JCLplus<sup>+</sup> DevOps ToolChain Pack is a robust architecture that enables JCLplus<sup>+</sup> mainframe testing service integration with popular DevOps tools, including Integrated Development Environments (IDEs), REST APIs, Java Command-Line Interface (CLI) and more.

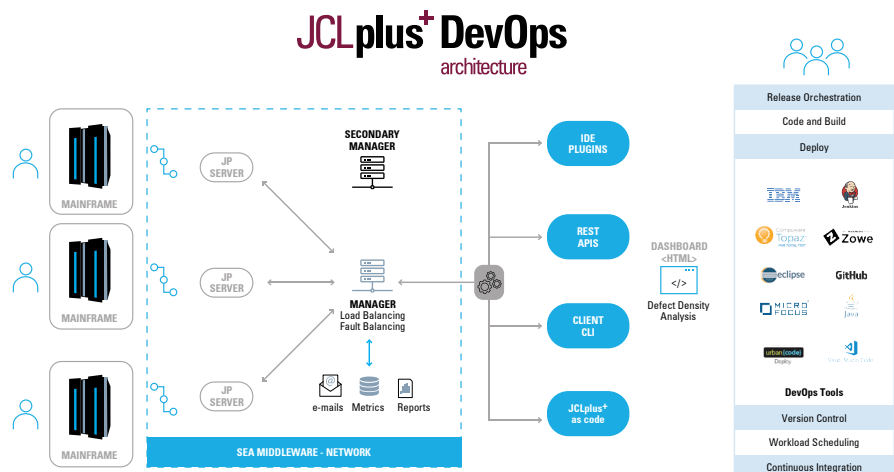
## SCALABLE AND FAULT-TOLERANT INTEGRATION ARCHITECTURE

Using SEA's JCLplus<sup>+</sup> for DevOps architectural model and the SEA middleware network, JCLplus<sup>+</sup> DevOps ToolChain Pack enables DevOps-to-mainframe integration that is horizontally scalable, fault tolerant and supports load balancing.

## INTEGRATES JCL TESTING SERVICES INTO MODERN DEVOPS TOOLCHAINS

JCLplus<sup>+</sup> DevOps ToolChain Pack provides a set of plug-ins for Eclipse-based and VS Code IDEs that enable IDE integration with JCLplus<sup>+</sup> mainframe testing services. Supported IDEs include:

- BMC AMI DevX Workbench for Eclipse
- IBM Developer for z/OS (IDz)
- Micro Focus Enterprise Developer by Open Text
- Visual Studio Code (VS Code)
- Eclipse IDE from the Eclipse Foundation
- Other Eclipse-based IDEs



IDE plug-ins also provide scheduler integration and facilitate JCL defect analysis in large scheduled job streams.

## SCRIPTS & RESTful APIs FOR JOB VALIDATION & RUN-TIME SIMULATION

JCLplus<sup>+</sup> DevOps ToolChain Pack supports IBM Z/mainframe Job validation and run-time simulation using any scripting language via a client program or by using RESTful API calls.

## COMMAND LINE INTERFACE CLIENT (CLI)

DevOps ToolChain Pack's Client CLI (command-line interface) service for JCL defect management supports operations to check, edit or reformat JCL from any non-mainframe script. Client CLI defect management works with individual or multiple JCL files. It integrates with any JCL repository.

## AUTOMATES BATCH QUALITY CHECKING WITH YAML & JCLPLUS-AS-CODE

DevOps ToolChain Pack introduces a new programming paradigm to automate batch quality checking: *JCLplus-as-code*. JCLplus-as-code uses the YAML data serialization language to craft complex testing scenarios and speed up batch defects automation. A Java client can use a tasks file describing the operations performed using the YAML syntax, which is very easy to understand, read and write.



# JCLplus<sup>+</sup> Dev Plug-in

## INTEGRATED JCL MANAGEMENT FOR ECLIPSE ENVIRONMENTS

JCLplus<sup>+</sup> Dev Plug-in is an Eclipse-based Integrated Development Environment (IDE) plug-in that streamlines the z/OS development process into structured and modern Eclipse-based tools.

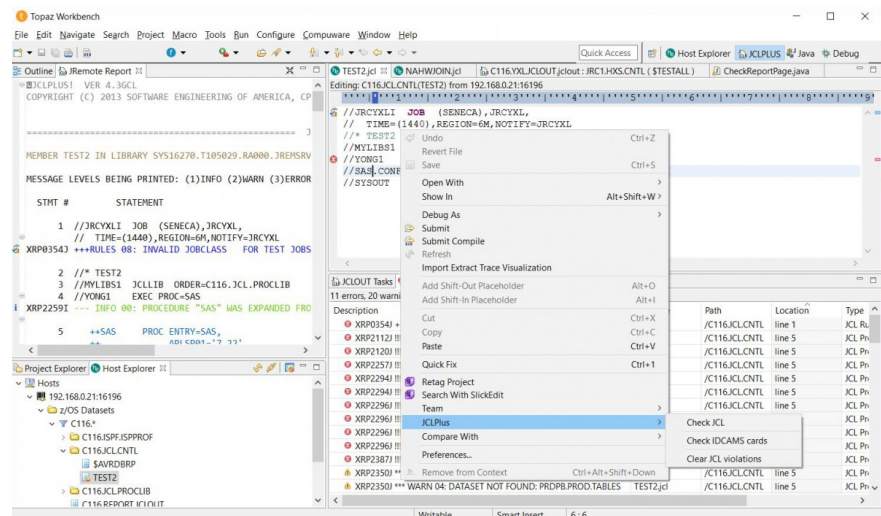
Designed using SEA's proprietary middleware technology, JCLplus<sup>+</sup> Dev Plug-in extends SEA's JCL validation and runtime simulation functionality to any Eclipse-based IDE. Developers can request and receive JCL Management services entirely within an Eclipse desktop environment, empowering TSO development and simplifying JCL maintenance & support tasks.

JCLplus<sup>+</sup> Dev Plug-in functionality is also included as part of the JCLplus<sup>+</sup> DevOps ToolChain Pack.

## INTEGRATES JCL TESTING SERVICES INTO ECLIPSE-BASED IDEs

Supported Eclipse-based IDEs include:

- BMC AMI DevX Workbench for Eclipse
- IBM Developer for z/OS (IDz)
- Micro Focus Enterprise Developer by Open Text
- Eclipse IDE from the Eclipse Foundation
- Other Eclipse environments
- Microsoft VS Code



## JCL SYNTAX CHECK AND RUN-TIME SIMULATION

JCLplus<sup>+</sup> Dev Plug-in specifies which z/OS LPAR to target for a requested JCLplus<sup>+</sup> validation service. JCLplus<sup>+</sup> then performs a thorough JCL run-time simulation on the targeted LPAR and returns the results back to the plug-in for display within the Eclipse environment.

## COLOR-CODED ERROR MESSAGES AND FILTERS

Returned error messages, warnings and informational messages from scanned results are color-coded for easy identification and navigation.

## VERIFIES JCL PRODUCTION STANDARDS

Enables enforcement of JCLplus<sup>+</sup> coding practices, naming conventions and resource utilization for increasing productivity, reducing outages and enabling automation & repetitive tasks.

## COMPRESSION & ENCRYPTION CAPABILITIES

JCLplus<sup>+</sup> Dev Plug-in also provides compression functionality to minimize network impact and encryption capabilities for security.



# JSLplus<sup>+</sup>

## JAVA BATCH CAPABILITIES FOR z/OS

Java Batch applications written to the JSR-352 open standard are portable and can run in many environments, including z/OS. JSR-352 introduced the Job Specification Language (JSL), an XML-based language that defines batch jobs and associated artifacts within the batch programming model. Job XMLs play a crucial role in this process.

## IBM Z JOB XML TOOLKIT

JSLplus<sup>+</sup> plugin provides a comprehensive set of tools to validate individual Job XMLs, all Job XMLs in an Eclipse project, or all Job XMLs packaged within a web archive (WAR) file.

## TOTAL ECLIPSE-BASED IDE COMPATIBILITY

JSLplus<sup>+</sup> is compatible with any Eclipse-based Java Integrated Development environment (IDE), including IBM Developer for z/OS (IDz), BMC AMI DevX Workbench for Eclipse, Micro Focus Enterprise Developer by OpenText, Eclipse IDE from the Eclipse Foundation and others.

## JOB XML SYNTAX CHECKING AND JSL-SPECIFIC ERROR DETECTION

JSLplus<sup>+</sup> ensures your XML files are valid and free of any JSL-specific errors.

## HELPS MINIMIZE DEFECTS & IMPROVE BATCH LIFECYCLE EFFICIENCY

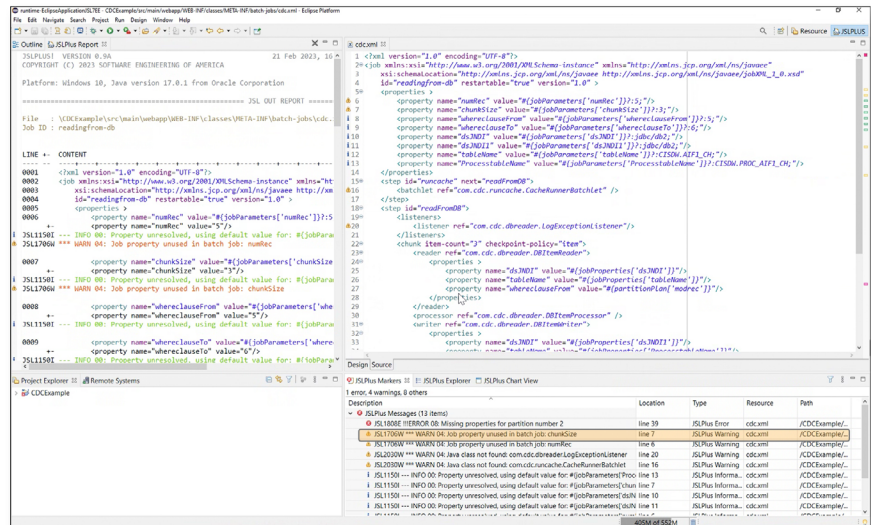
With JSLplus<sup>+</sup>, Java Batch quality controls can be applied to existing batch lifecycle processes, minimizing costly production defects and improving overall efficiency.

## JSL SEMANTICS & ARTIFACT REFERENCE VALIDATION

JSLplus<sup>+</sup> validates forward references, property references and artifacts such as Java classes & their correct implementation of interfaces.

## REPORTS & CROSS-REFERENCE WINDOWS FOR JAVA BATCH PROCESSING

The JSLplus<sup>+</sup> plug-in generates warnings & error reports, creates searchable JSL index references, & enables graphical visualization of Java Batch job flows.



# XREFplus<sup>+</sup>DBr

## JCL CROSS REFERENCE

Preventing problems before they occur is as important as resolving them quickly when they crop up. Quickly and accurately understanding the relationships between components of your JCL environment can mean the difference between a smoothly running batch cycle and an expensive production outage.

XREFplus<sup>+</sup>DBr is a powerful tool that enables you to comprehensively determine how your installation's batch jobs are using dynamically created datasets, JOBS, PROCs, programs, DB2 info and scheduling components.

It not only gives you a complete picture of the interrelationships of your JCL, programs and datasets, but the open database architecture allows you to easily integrate other data with the data collected by XREFplus<sup>+</sup>DBr.

## COMPREHENSIVE DOCUMENTATION

XREFplus<sup>+</sup>DBr creates a DB2 database of the most important components of your batch job processes, including JOBS, PROCs, programs, dynamically allocated datasets, DB2 Catalog Info, SMF History and scheduling components. The database can be accessed through either ISPF, Windows or browser.

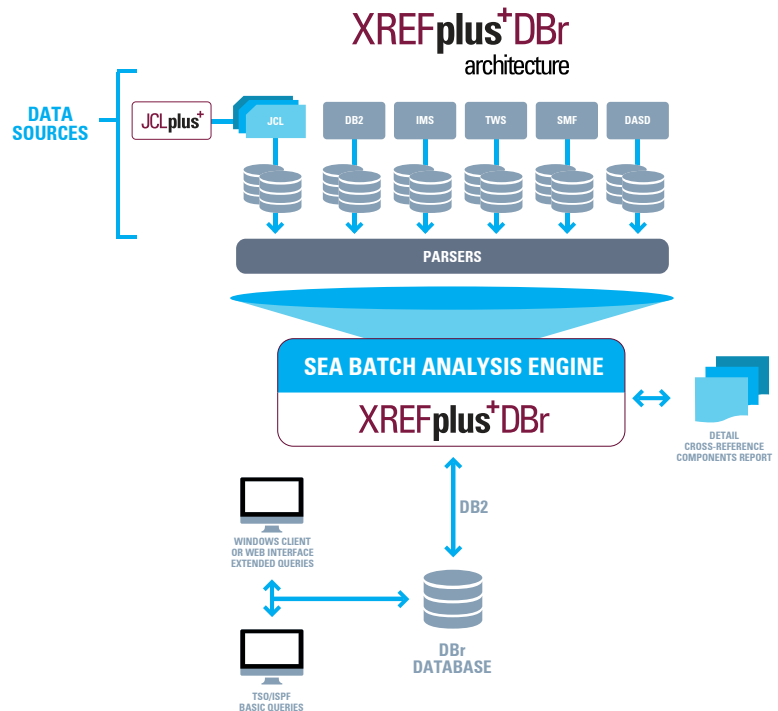
Retrieving the information you need is accomplished quickly and with considerable flexibility. The XREFplus<sup>+</sup>DBr GUI allows you to easily formulate queries to retrieve the data you require.

From the main screen, you can choose and customize each view using:

- Datasets
- JOBS
- PROCs
- SMF History
- Programs
- DB2 Catalog Info
- Scheduling Components

## SECURE, CUSTOMIZABLE ACCESS

Access to the features and functionality of the XREFplus<sup>+</sup>DBr interface can be easily controlled and restricted. Each user can have an individualized view of the product and its functionality.



### APPLICATION RESEARCH, CHANGE IMPACT ANALYSIS & PROBLEM CORRECTION

Locating the information you need is often only the first step. Frequently, further analysis is required. With XREFplus+DBr, you can browse or edit the components referenced in the database to quickly zero in on the data you need.

### COMPLEX ENVIRONMENTS

Today's data centers are complicated places. Companies may have several physical machines and multiple z/OS images running in different locations. Batch processes may be balanced across a SYSPLEX environment. This can make it extremely time consuming and difficult to get a clear understanding of the interaction among batch jobs and applications, especially at places where the original developers are not available.

XREFplus+DBr lets you combine information from any number of z/OS images into one database, simplifying the task of understanding how your applications interrelate and impact one another. The graphical presentation makes it easy to see exactly which data flows from job-to-job and application to application.

### EXTENDABLE, CUSTOMIZABLE INTERFACE

The XREFplus+DBr GUI or WEB UI interface can be easily extended and customized to incorporate data related to your unique environment. The XREFplus+DBr DB2 Table definitions are fully documented, and the unique Report Definition facility allows you to add custom presentation formats to meet your needs.

### DATA COLLECTION AND DB2 DATABASE LOAD

The collection and loading of data for the XREFplus+DBr repository is extremely efficient. The data collections for JCL, DB2 Catalog Info, SMF History, etc., are run asynchronously and can be run in parallel.

The DB2 database load process uses standard DB2 utilities to load the data from the collection step(s).

### DYNAMIC ENVIRONMENTS & CHANGE MANAGEMENT INTEGRATION

Change is a constant in the data center. Changes to JOBS and PROCs occur constantly. Your view of that data must be current to be trusted as accurate.

XREFplus+DBr supports incremental updates. The update process can easily be integrated into your JCL promotion process to ensure that the database is up-to-date.

In addition, all information is not necessarily reflected in the JCL. As jobs execute, they may, for example, dynamically allocate datasets or dynamically load programs. XREFplus+DBr captures SMF Job History and automatically relates the data to the static JCL database, ensuring that you always have a complete view of your batch processes.

### TECHNICAL SUMMARY

Engineered for easy and efficient access to critical system information, XREFplus+DBr is an ideal component of your total JCL management solution. Used in combination with JCLplus+, our customers achieve a level of batch process maturity that extends beyond the utility of each product used individually.

### FLEXIBLE MODES OF OPERATION

- ISPF, Windows GUI or Browser Access
- Batch Reporting Capability
- Customizable Panels
- Push-button Conversion of Query Results to PDF Format

### POWERFUL RESEARCH TOOL

- Text and Graphical Data Presentation
- Ability to Trace Data Flow
- Robust Drill-Down Capabilities
- Integrates Dynamic File and Program Info

For less complex environments, the XREFplus+ and XREFplus+DB plus+Pack modules provide the best solution for automated JCL documentation and cross-referencing requirements. XREFplus+ provides over 40 different reports to help monitor and manage a JCL environment, while XREFplus+ DB makes it easy to identify both the users and uses of datasets, JOBS, PROCs and other JCL components.

**INSTALLATION**

- Quick install utility allows the product to be installed in minutes and requires no IPLs, SVCs, hooks, or operating system changes.
- Runs in any z/OS environment
- Supports industry-standard JCL libraries
- GUI Desktop Runs on MS Windows or web browser

**24/7 CUSTOMER SUPPORT**

- An experienced technical support team is available 24 hours a day, 7 days a week
- Direct contact between users and product development staff is readily available

**SUPPORT FOR CUSTOM APPLICATIONS & ENHANCEMENTS**

Conversion, Implementation and Training Assistance is available. SEA offers the best vendor JCL expertise available to ensure incremental, measurable and sustainable improvements in the JCL and Batch Environments of our customers.

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**ABOUT SOFTWARE ENGINEERING OF AMERICA (SEA)**

Established in 1982, Software Engineering of America (SEA) has built a worldwide reputation as a leading provider of IBM Mainframe and IBM i optimization, automation and security solutions with products licensed at thousands of enterprises worldwide, including 9 of the Fortune 10 and over 85% of the Fortune 500. SEA provides a full line of mainframe solutions covering all aspects of automation and optimization including Batch Performance & Optimization, JCL Management, Report & Output Management and a full line of IBM i Security and System Monitoring solutions.