

Powerful Programming Options for SPSS Users and Developers

The SPSS Statistics Programmability Extension dramatically increases the power, capabilities, and usability of SPSS Statistics Base and modules. Developers and end users can use this feature to extend the command syntax language, introduce additional statistical functionality, and access the SPSS Statistics engine from external applications.

The SPSS Statistics Programmability Extension enables your organization to extend SPSS Statistics with external programming languages such as Python®, R, and the .NET version of Microsoft® Visual Basic®. It also allows external applications to access the SPSS Statistics Processor and draw upon its vast wealth of functionality. An enhanced version of the SPSS Statistics Programmability Extension is included with SPSS Statistics Base 17.0—making SPSS Statistics a very powerful solution for statisticians and developers.

With the SPSS Statistics Programmability Extension, you can:

- Use external programming languages from within the SPSS Statistics command syntax by using the BEGIN PROGRAM and END PROGRAM commands
 - The external language for which you have installed integration support is invoked via BEGIN PROGRAM
 - Statements between BEGIN PROGRAM and END PROGRAM are written in the external programming language you have chosen, and are executed entirely by the external language's processor
 - Different supported languages can be called in separate programs within command syntax
- Gain programmatic access to the SPSS Statistics analytical engine through an application program interface (API). APIs provide programs with:
 - Direct access to the active dataset's variables, variable properties and attributes (name, format, labels, measurement level, type, and user-defined attributes), case count, and case data
 - Access to an in-memory, XML version of the data dictionary and procedure output
 - An XPath evaluation engine that allows access to and navigation of the in-memory XML workspace
 - A method for queuing and executing command syntax
 - Direct access to the last error code and message
- Develop your own procedures—including those for statistical analyses not included in SPSS Statistics
 - Define new syntax in SPSS Statistics style via an XML schema and have SPSS Statistics handle parsing and error checking
 - The procedure can send results into an SPSS Statistics pivot table or into text blocks—essentially extending the analytical capabilities of SPSS Statistics

- Obtain server-side scripting through external languages
 - An open extension to the SPSS Statistics backend enables you to write code using suitable external programming languages and include the code within production syntax jobs
 - Scripts execute at the location of your SPSS Statistics processor. Depending on the type of system you are using, your scripts will execute on either the client or the server. If you execute scripts on SPSS Statistics Server, you can perform operations previously available only through client-side scripting.

Programming capabilities

Combining backend processor APIs with an external programming or scripting language opens up a limitless set of new possibilities from within syntax jobs.

For example, use the SPSS Statistics Programmability Extension to control the flow of your command syntax jobs through conditional execution control statements (such as “If/Then/Else”) and looping control statements (such as “For” and “While”) found in the external programming language’s syntax.

Use scripts written in external programming languages to conditionally execute or make decisions about which syntax is executed based on a particular condition, such as:

- The value of the variable attributes in the data dictionary
- Values in the output
- Values in the active dataset
- Error-level return codes from SPSS Statistics procedures

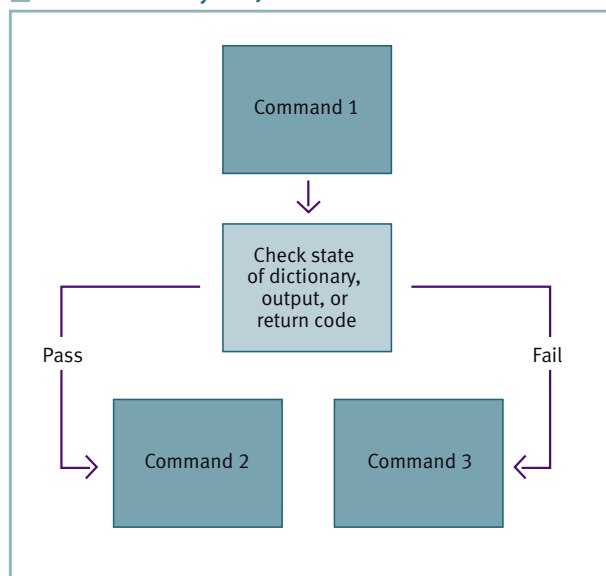
In short, you can create reusable code that speeds the process of turning data into decisions.

Additionally, take advantage of all your external programming language’s non-SPSS Statistics-related capabilities in your scripts. For example, have a production job trigger an e-mail notification once your job has successfully completed.

Benefits

- Extend SPSS Statistics functionality. The SPSS Statistics Programmability Extension enables you to add functionality not included in SPSS Statistics.
- Write generalized and more flexible jobs. Create generalized jobs by controlling logic based on the Variable Dictionary, procedure output (XML or datasets), case data, and environment. Reusable code means data is not tied to a single program.
- Handle errors with generated exceptions. The SPSS Statistics Programmability Extension makes it easy to check whether a long syntax job worked. Hundreds of standard modules for Python are available.
- React to results and metadata
- Build SPSS Statistics functionality into other applications

SPSS Statistics Syntax Job Flow



Control the flow of your SPSS Statistics syntax jobs. In this example, command 1 is executed. Then, if the dictionary, output, or return code passes, command 2 is performed. If it fails, command 3 is performed instead.

Take advantage of procedures created and shared by other users through SPSS Developer Central

How to get started—integration plug-ins

Since the SPSS Statistics Programmability Extension is included with SPSS Statistics Base, you can get started quickly. SPSS Statistics Programmability Integration Plug-Ins are available online at SPSS Developer Central, www.spss.com/devcentral. This allows you to take advantage of this advanced programmability functionality immediately.

An SPSS Statistics Programmability Integration Plug-In provides the crucial link and configuration instructions that enable a syntax job to take advantage of a specific external programming language or dynamic link library (DLL).

Also available for download is the SPSS Statistics Programmability Extension SDK. This provides software developers with the information needed to develop an SPSS Statistics Programmability Integration Plug-In for a programming language's use with the SPSS Statistics Programmability Extension. In addition to providing documentation for creating a new plug-in, it includes the full source code for the example SPSS Statistics-Python Integration Plug-In.

New Programmability Integration Plug-Ins are being developed by SPSS Inc., and will be available to download at SPSS Developer Central as soon as they are ready.

SPSS Statistics-Python Integration Plug-In

The SPSS Statistics-Python Integration Plug-In is a complete, freeware example plug-in for integrating the open source Python* programming language with the SPSS Statistics Programmability Extension.

The SPSS Statistics-Python Integration Plug-In includes:

- An installer that configures itself for use with SPSS Statistics
- A native Python package, which contains a library of functions that interact with the SPSS Statistics backend processor API
- Complete documentation with examples

The SPSS Statistics-Python Integration Plug-In enables you to use the BEGIN PROGRAM and END PROGRAM syntax commands to extend syntax with Python programming. You can also use this plug-in to access and drive the SPSS Statistics backend processor from an external application.

Before installing the SPSS Statistics-Python Integration Plug-In, you will need to install Python. The version of Python recommended for your version of SPSS Statistics is included on the SPSS Statistics installation CD.

SPSS Statistics-.NET Integration Plug-In

The SPSS Statistics-.NET Integration Plug-In is a complete, freeware example plug-in for integrating the .NET** version of Microsoft Visual Basic with the SPSS Statistics Programmability Extension.

The SPSS Statistics-.NET Integration Plug-In includes:

- An installer that configures itself for use with SPSS Statistics
- A native .NET package, which contains a library of functions that interact with the SPSS Statistics backend processor API
- Complete documentation with examples

The SPSS Statistics-.NET Integration Plug-In allows you to drive the SPSS Statistics analytical engine from an external application.

Before installing the SPSS Statistics-.NET Integration Plug-In, you will need to download and install a copy of the .NET Framework from the Microsoft Download Center at **www.microsoft.com/downloads**.

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SPSS Statistics-R Integration Plug-In

The SPSS Statistics-R Integration Plug-In is a complete, freeware example plug-in for integrating the R*** programming language with the SPSS Statistics Programmability Extension.

The SPSS Statistics-R Integration Plug-In includes:

- An installer that configures itself for use with SPSS Statistics
- An integrated R package, which contains a library of functions that interact with the SPSS Statistics backend processor API
- Complete documentation with examples

The SPSS Statistics-R Integration Plug-In enables you to use the BEGIN PROGRAM and END PROGRAM syntax commands to extend syntax with R programming.

Before installing the SPSS Statistics-R Integration Plug-In, you will need to download and install a copy of the R language from www.r-project.org.

Create user-defined procedures

With this release, you can extend the functionality of SPSS Statistics by creating user-defined procedures for specific statistical applications.

Using the new Custom Dialog Builder in combination with the SPSS Statistics Programmability Extension enables you to:

- Build customized user interfaces to support algorithms written in Python or R
- Add those custom interfaces to your menu system, where they can be accessed by other users

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SPSS Developer Central

SPSS Developer Central can be found at www.spss.com/devcentral. It is the online resource for end users and software developers interested in SPSS-related programming and development. From this Web site, you can download programmability extensions and sample code, access forums and participate in discussions on programmability practices, and read in-depth articles on SPSS Statistics programmability topics.

At SPSS Developer Central, you'll also find many example libraries and syntax jobs for use with plug-ins such as the SPSS Statistics-Python Integration Plug-In. Some examples of Python resources include:

- Functions for simplifying the calls to the SPSS Statistics backend processor for common tasks
- Functions for working with the SPSS Statistics Viewer
- Bootstrap regression
- Poisson regression

Another great resource for programmability in SPSS Statistics is *SPSS Programming and Data Management: A Guide for SPSS and SAS® Users*. This book documents the wealth of functionality beneath the SPSS Statistics user interface. It includes detailed examples of command syntax, the Output Management System (OMS), and extending command syntax with the Python® programming language.

For information on how to obtain a copy of this guide, visit www.spss.com/spss/data_management_book.htm.



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