

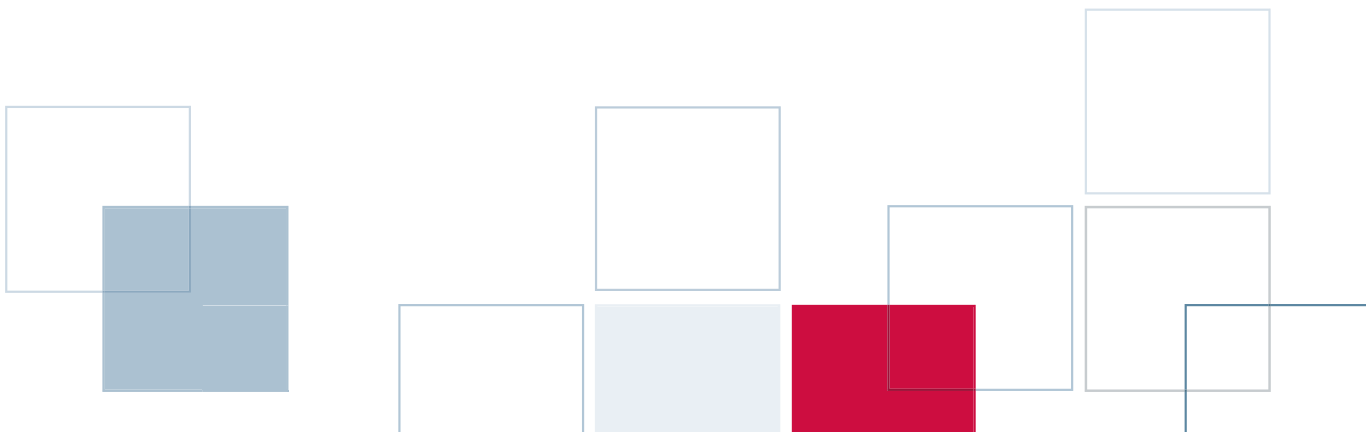
# > Powerful Programming Capabilities within SPSS

Dramatically increase the power and capabilities of SPSS for Windows® by using the SPSS Programmability Extension. Developers and end-users can use this feature to extend the SPSS command syntax language to create procedures and applications—and perform even the most complex jobs—within SPSS.

This powerful feature enables your organization to extend SPSS with external programming languages, such as Python® and the .NET version of Microsoft® Visual Basic®. Introduced in SPSS 14.0.2, the SPSS Programmability Extension is included with SPSS Base 15.0—making SPSS an even more powerful statistical solution.

With the SPSS Programmability Extension, you can:

- Drive external programming languages from within SPSS command syntax by using the BEGIN PROGRAM and END PROGRAM commands
  - The external language for which you have installed integration support can be invoked via BEGIN PROGRAM
  - Any 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
- Gain programmatic access to the SPSS backend processor 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), row 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 SPSS command syntax
  - Direct access to the last error code and message



- Develop your own procedures—including those for statistical analyses not included in SPSS
  - Create a user interface (UI) in SPSS for any procedures you develop
  - End-users of the procedure can send results into an SPSS pivot table—essentially extending the analytical capabilities of SPSS
- Obtain server-side scripting through external languages
  - An open extension to the SPSS backend enables you to write code using suitable external programming languages and include the code within SPSS production syntax jobs
  - Scripts execute at the location of your SPSS 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 Server, you can perform operations previously available only through client-side scripting.

### Unlimited programming capabilities

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

For example, use the SPSS Programmability Extension to control the flow of your SPSS 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.

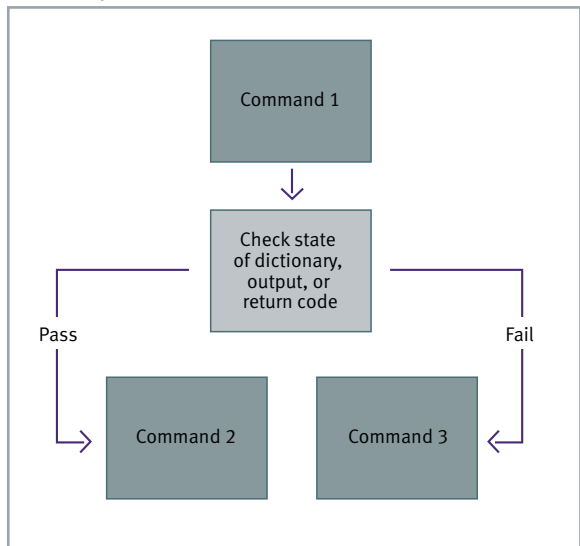
Use scripts written in external programming languages to conditionally execute or make decisions about which syntax is executed based on a particular condition, such as:

- The value of the variable attributes in the data dictionary
- A value in the output
- A value in the active dataset
- Error-level return codes from SPSS 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-related capabilities in your scripts. For example, have a production job trigger an e-mail notification once your job has successfully completed.

#### ■ SPSS Syntax Job Flow



Control the flow of your SPSS 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, then command 3 is performed instead.

## Benefits

- Extend SPSS functionality. The SPSS Programmability Extension enables you to add computations not included in SPSS.
- 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 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 functionality into other applications

## How to get started

Since the SPSS Programmability Extension is included with SPSS Base 15.0 for Windows, you can get started quickly. Just integrate SPSS Base with an SPSS Programmability Integration Plug-In to take advantage of this advanced programmability functionality.

## SPSS Programmability Integration Plug-Ins

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

Use the freeware plug-ins that SPSS Inc. has already built for Python and .NET, or follow the instructions in the SPSS Programmability Extension Software Developer's Kit (SDK) to build your own. You can download freeware plug-ins from

the SPSS Developer Central Web site at [www.spss.com/devcentral](http://www.spss.com/devcentral). 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-Python Integration Plug-In

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

The SPSS-Python Integration Plug-In includes:

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

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

Before installing the SPSS-Python Integration Plug-In, you will need to download and install a copy of Python. To enable direct installation of this programming language, Python is included on the SPSS 15.0 installation CD.

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### **SPSS-.NET Integration Plug-In**

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

The SPSS-.NET Integration Plug-In includes:

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

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

Before installing the SPSS-.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](http://www.microsoft.com/downloads).

### **SPSS Programmability Extension SDK**

The SPSS Programmability Extension SDK provides software developers the information needed to develop an SPSS Programmability Integration Plug-In for another interpreted programming language or compiled DLL. In addition to providing documentation for creating your own integration package, it includes the full source code for the SPSS-Python Integration Plug-In and SPSS-.NET Plug-In. You can download the SDK from SPSS Developer Central.



To learn more, please visit [www.spss.com](http://www.spss.com). For SPSS office locations and telephone numbers, go to [www.spss.com/worldwide](http://www.spss.com/worldwide).

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### **SPSS Developer Central**

SPSS Developer Central can be found at [www.spss.com/devcentral](http://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 programmability topics.

At SPSS Developer Central, you'll also find many example libraries and syntax jobs for use with the SPSS-Python Integration Plug-In. Current Python examples include:

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

\*\* SPSS Inc. is not the owner or licensor of the .NET Framework. All .NET users must agree to the terms of the license agreement located on the Microsoft Web site. SPSS does not make any statement about the quality of the .NET Framework. SPSS fully disclaims all liability associated with your use of .NET Framework. For more information on .NET, visit [www.microsoft.com/net](http://www.microsoft.com/net).

