

EZ-Metrix® V4.0.1.3 Administrator Guide



Table 1 – Revision History

Date	Version	Author	Reason
7/17/04	0.1	James T. Heires	Original
7/25/04	0.2	James T. Heires	Added description of algorithm, reporting
8/29/04	0.3	James T. Heires	Added Purge Database description
9/12/04	0.4	James T. Heires	Added trademark to EZ-Metrix
11/6/05	0.5	James T. Heires	Added sections about creating and modifying rules, and session time-out
2/1/06	0.6	James T. Heires	Added rules parameters by language, IE6 trusted site instructions
11/15/14	0.7	James T. Heires	Added enhancements, bug fixes

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1. About EZ-Metrix®

Overview

EZ-Metrix is a web-based source code counting utility. The first tool of its kind, EZ-Metrix combines a consistent measurement of source code across programming languages, platforms and operating systems with the portability of a hosted application. Armed with an EZ-Metrix account, you will be able to connect to the Internet, login to EZ-Metrix for the first time, select and measure source code and produce meaningful reports all within minutes! EZ-Metrix comes standard with several useful features that are offered to make your job easier and much faster. As an application administrator, you are able to setup user accounts and manage their access to their accounts, as well as all the features available to the basic user.

Copyright

EZ-Metrix is protected under international copyright laws. Duplication, redistribution or reselling without express written permission from James Heires Consulting, Inc. is unlawful. Persons violating the law will be prosecuted to the full extent of the law.

Roles

EZ-Metrix operates through the use of two different types of user roles (Administrator and Basic User) to support its various features. This document describes the features associated with the Administrator role. The Basic User role is described in the EZ-Metrix User Guide¹.

When an EZ-Metrix account is created (of either role mentioned above), it is associated with a Customer Name, which identifies an organization, company or individual license holder. The Customer Name is a collection mechanism that allows for simple administration of user accounts within an organization. The Customer Name may be any text, but typically would be the name of your organization. Accounts of each role must be associated with exactly one Customer Name.

The relationship between system roles is illustrated in Figure 1. Notice that the **Administrator** and all **Basic User** accounts are related to the Customer Name of **Customer A**.

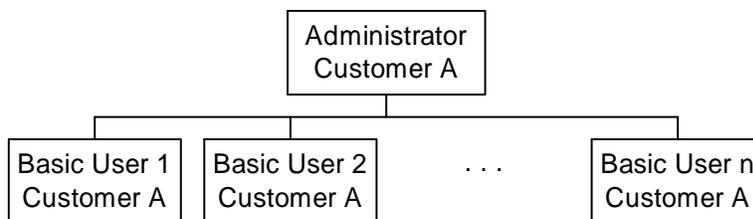


Figure 1 – EZ-Metrix Account Model

Administrator

The Administrator role is designed for a small number of application administrators in an organization, whose responsibility it is to provide users controlled access to this application, and manage user accounts. In addition to having access to all Basic User features (see description below), **Administrators may add, modify and remove Basic User and other Administrator accounts**. In addition, Administrators may search by query to find accounts within their group. Any number of Administrator accounts may be established for a given Customer.

¹ Available from www.ezmetrix.com, or info@jamesheiresconsulting.com.

Basic User

A Basic User may measure files, compare files, run and export reports, establish rules and view help topics. This role is fully detailed in the EZ-Metrix User Guide.

Security

All source code measured by EZ-Metrix stays on the local computer, *never being sent over the Internet*. Because the EZ-Metrix application is downloaded to the local computer, the system does not require uploading your files. This way, all your source code remains secure. Only your reports and settings are stored on the server, so that no other user (outside of those associated with your Company account) may view or download your reports.



2. Getting Started

Before starting your first measurement or Administration session, be sure you have available your username and password and that your system satisfies the minimum system configuration requirements described in Section 7.

Trusted site

Open Internet Explorer (IE) and configure <http://www.ezmetrix.com> as a trusted site. In IE version 6.0 this is performed as follows. If you have an earlier or later version of IE, please consult your user guide or help system to establish trusted sites.

1. Select **Tools** menu
2. Select **Internet options...**
3. Select the **Security** tab
4. Select the **Trusted sites** icon
5. Select the **Sites...** button
6. Type <http://www.jamesheiresconsulting.com> under **Add this Web site to the zone**
7. Select the **Add** button
8. Select the **OK** button
9. Select the **OK** button again

Logging in

Enter the URL <http://www.ezmetrix.com> into the Address field. The Login Screen shown in Figure 2 will appear.

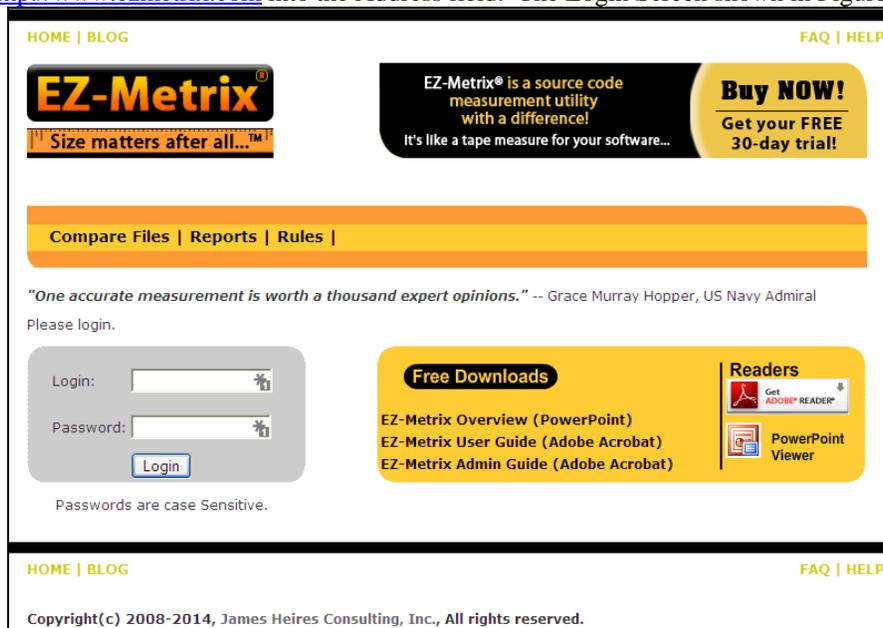


Figure 2 – EZ-Metrix Login Screen

Login with the Administrator username and password that was provided to you when you purchased EZ-Metrix. Make sure to use the exact password capitalization that was provided to you, as passwords are case-sensitive for your privacy. In other words, the password “Rover” is a different password than “rover.”

After logging in for the first time successfully, you may get a security warning before the application is downloaded to your computer (see Figure 3). This warning indicates that the application is not signed with a secure signature. Click on Yes to continue. After the first time you successfully login, you will no longer receive this security warning.



Figure 3 – Unsigned ActiveX control warning

You may also receive a warning about downloading ActiveX controls from IE. If this happens, you will have to change some settings on your browser to allow the application to be downloaded to your computer. In Internet Explorer's **Tools/Internet Options...** menu, select the **Security** tab, then **Custom Level** to view the Security Settings dialog box, shown in Figure 4. In the **ActiveX Controls and Plugins** section, select **Prompt** in both the **Download signed ActiveX controls** and **Download unsigned ActiveX controls**, as shown.

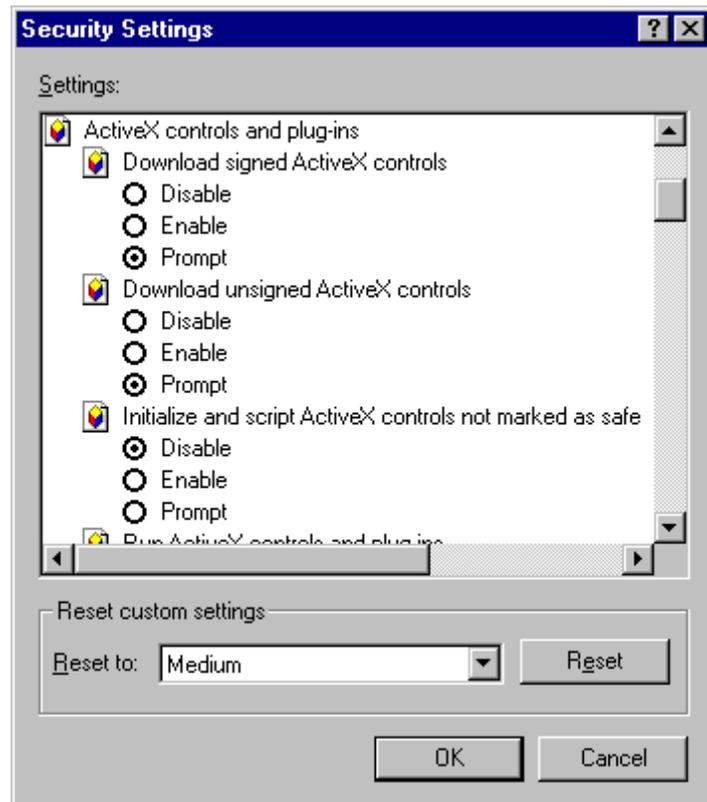


Figure 4 – Internet Explorer Security Settings

After the application downloads, you will be presented with the Administrator Home Page (Figure 5). This is where all major system functions are available. Note the addition of the **Admin** menu item, which is an additional menu item to the Basic User's Main Menu.

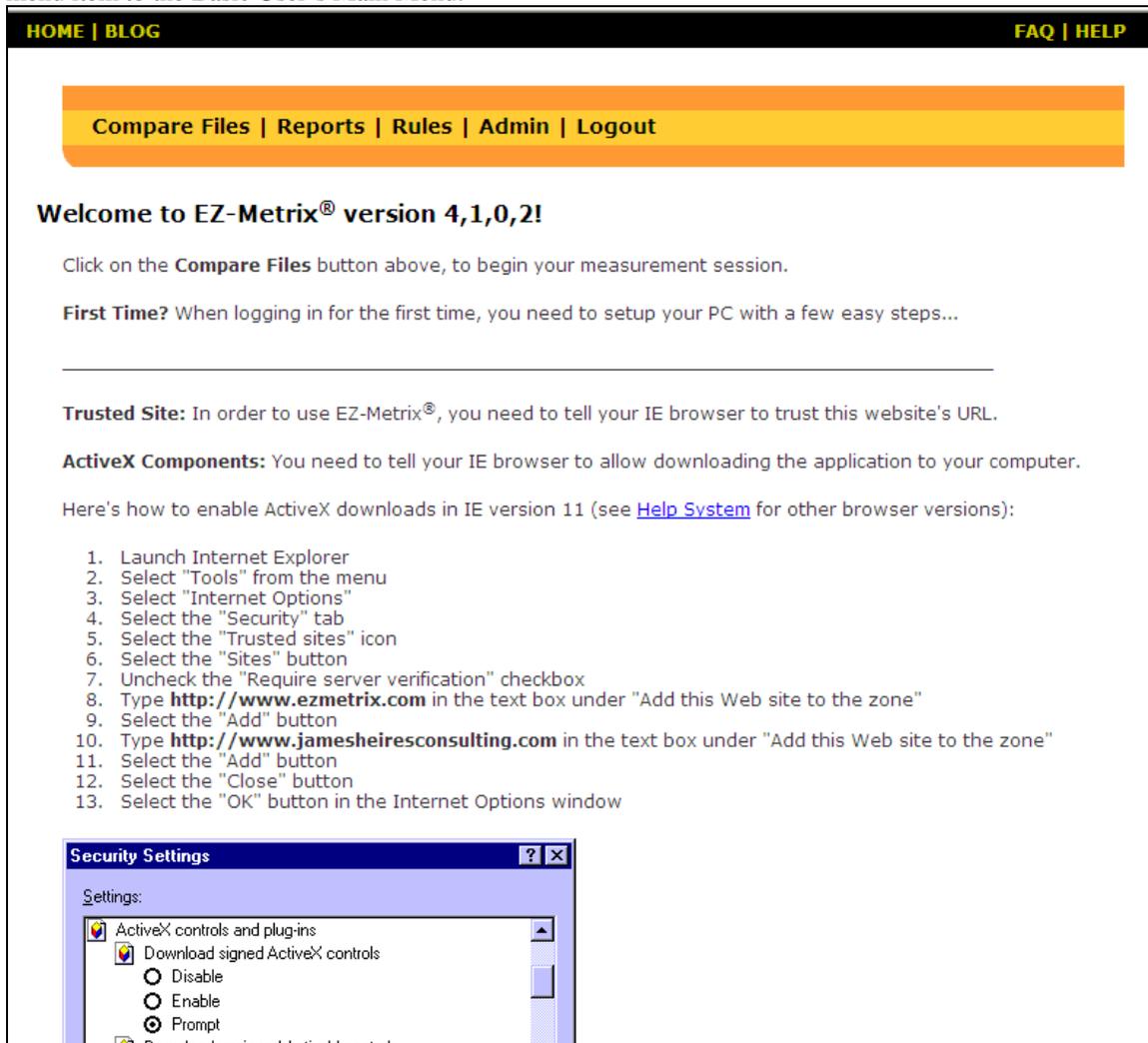


Figure 5 – Administrator Home Page

3. Running EZ-Metrix

The EZ-Metrix Administrator functionality consists of all Basic User features (described in the EZ-Metrix User Guide), plus four additional features: **Add Users, Modify Users, Delete Users and View Users.**

Add User

In order to add a new user to your Customer account, click on the Admin menu item and the Administrator menu will be displayed (see Figure 6). Click on the Add/Modify/Delete Users item and the Administrator Add User screen (

Figure 7) will be displayed.

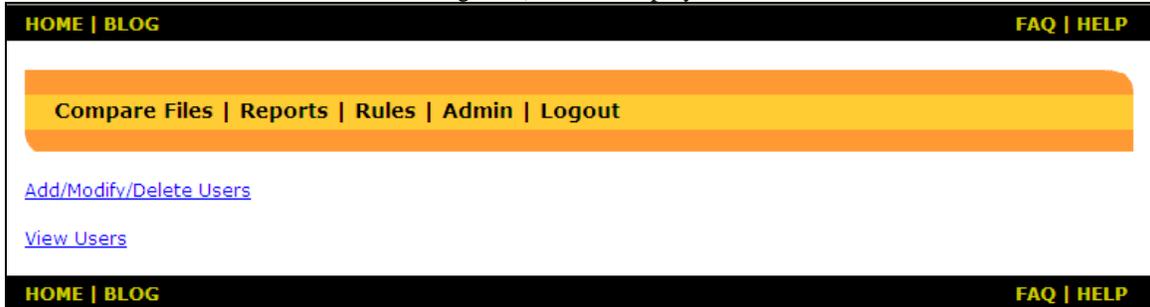


Figure 6 – Administrator Main Menu

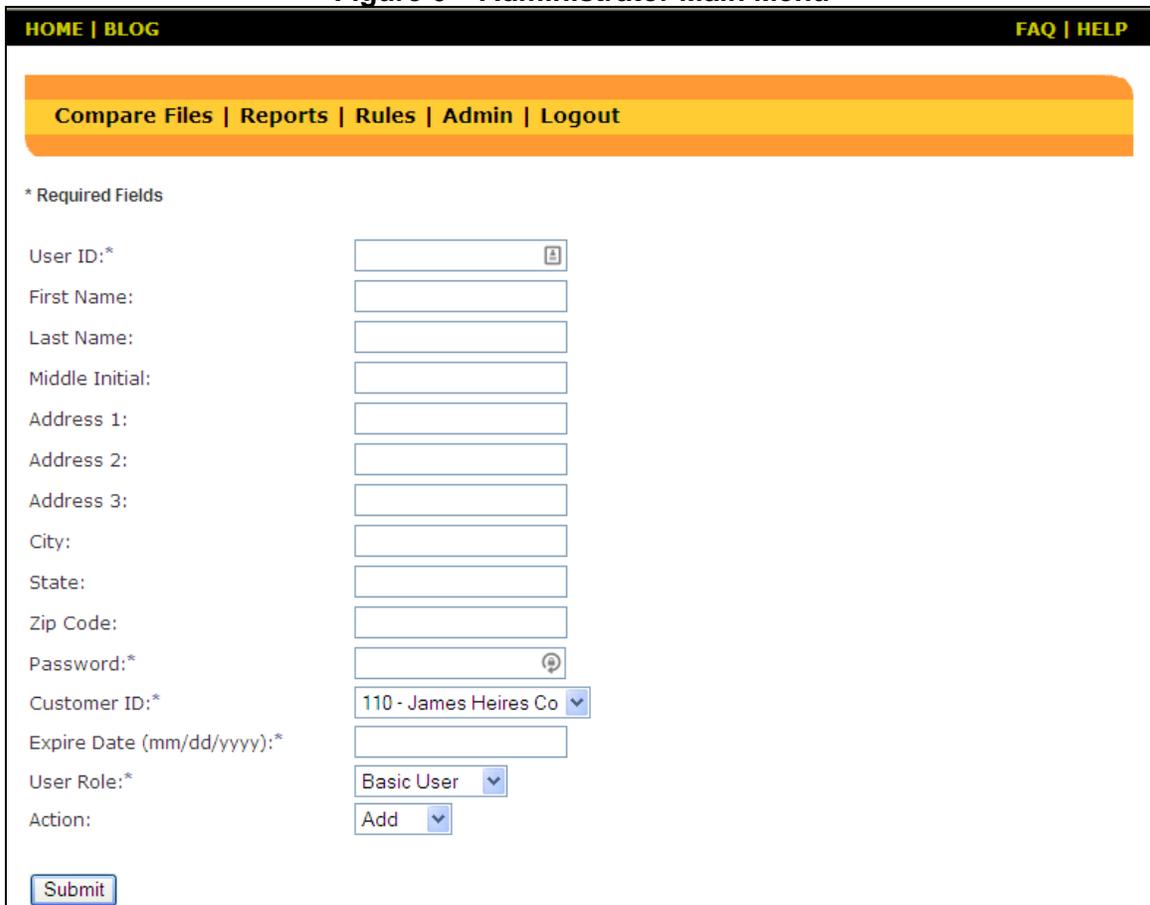


Figure 7 –Add User Screen

Enter information into the required fields as a minimum (other data may be provided as well, in order to better manage a group of users):

- User ID
- Password
- Customer ID (this will be prepopulated with your Customer Name)
- Expiration Date (in **MM/DD/YYYY format**)
- User Role (choose from Basic User or Administrator)

In the **Actions** drop-down list, select **Add**, and then click on the **Submit** button to add the new account. After the account is created, a confirmation message will be displayed. Click the **To Admin** button to return to the Administrator Main Menu screen.



Modify User

To modify an existing user’s account from the Administrator Main Menu (Figure 6), click on the **Add/Modify/Delete Users** hyperlink and the Administrator Modify User screen (Figure 8) will be displayed.

Figure 8 – Modify User Screen

Enter information into the following fields:

- User ID
- Password
- Customer ID (this will be prepopulated with your Customer Name)

In the **Actions** drop-down list, select **Query**, then click on the **Submit** button to find the account you wish to modify.

When the account is located, the remaining fields will be populated with all available account information. Change any information desired, select the **Modify** action, and then click the **Submit** button to commit the changes.



A Modify Confirmation Screen will be displayed to confirm your changes. Click the **To Admin** button to return to the Administrator Main Menu screen again.

Delete User

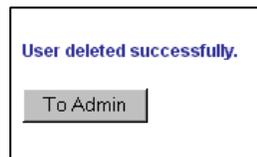
If an existing user account needs to be deleted, click on the **Add/Modify/Delete Users** hyperlink and the Administrator Modify User screen (Figure 8) will be displayed.

Figure 9 – Delete User Screen

Enter information into the following fields:

- User ID
- Password
- Customer ID (this will be prepopulated with your Customer Name)

In the **Actions** drop-down list, select **Query**, then click on the **Submit** button to find the account you wish to modify. When the account is located, the remaining fields will be populated with all available account information. Select the **Delete** action (Figure 9), and then click the **Submit** button to commit the changes. A Delete Confirmation Screen will be displayed to confirm your changes. Click the **To Admin** button to return to the Administrator Main Menu screen again.



View User

If you would like to view a list of user accounts for your Company, select the **View Users** hyperlink from the Administrator Main Menu screen. The View Users Screen will be displayed (Figure 10). This view allows an Administrator to view all user accounts (Administrators and Basic Users) for their Company.

User ID	First Name	Last Name	Password	Expire Date	Customer Name	Role
bobjones	Robert	Jones	bobjones	12/31/2005	XYZ Company	Administrator
johnsmith	John	Smith	johnsmith	12/31/2005	XYZ Company	Basic User

Figure 10 – View User Screen

Reports

To work with reports, click on the **Reports** link in the menu bar. The Reports menu (Figure 11) is presented. From this menu, several report options are available: View Quick Report, View Past Reports, Export Data to File and Purge Data from Database.

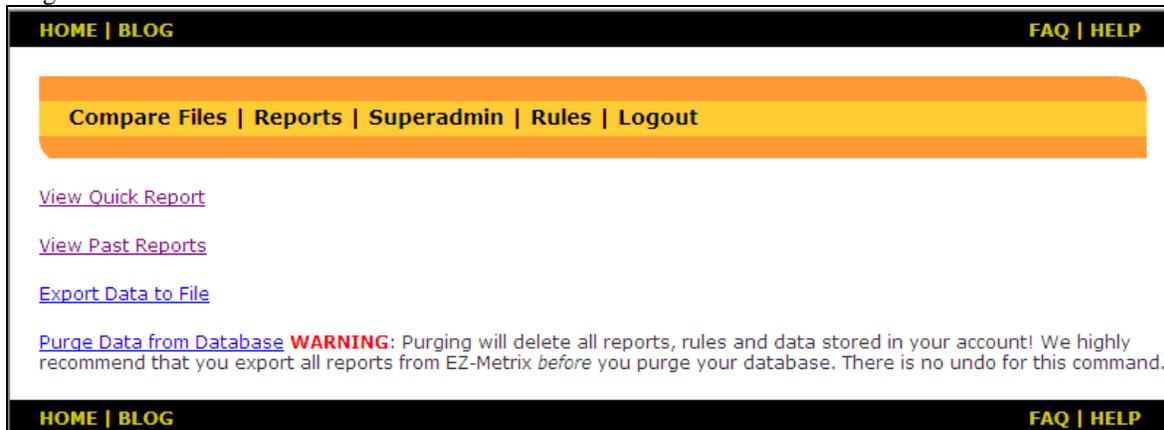


Figure 11 – Reports Screen

View Quick Report

A quick report is a report that shows the results of the latest measurement session carried out by any user in the company. In order to view a quick report, click on the **View Quick Report** hyperlink from the Reports Screen, and the latest measurement session report will be displayed (Figure 12).

The screenshot displays the 'View Quick Report' interface. At the top, there are navigation links for 'HOME | BLOG' and 'FAQ | HELP'. Below this is a yellow navigation bar with links for 'Compare Files | Reports | Superadmin | Rules | Logout'. The main content area is divided into three sections:

- Session Information:**
 - Compare Date: 11/8/2014
 - Session ID: 4051
 - Session Name: 28- 10,000 line comparison
 - Rule ID: PHP
 - Compare Type: File Compare
- Directory Results:**
 - Old Files Directory Path: C:\Documents and Settings\James\My Documents\Dropbox\EZ-Metrix\Version 5.0\Test Cases\Old\28\
 - New Files Directory Path: C:\Documents and Settings\James\My Documents\Dropbox\EZ-Metrix\Version 5.0\Test Cases\New\28\
 - Same Files: 1
 - Deleted Files: 0
 - New Files: 0
- File Results:**
 - Filename: Calculate_TF.php
 - [Compare Results](#)
 - New Lines: 285
 - Deleted Lines: 285
 - Same Lines: 9036
 - Changed Lines: 0
 - [Detailed Line Counts](#)
 - Comment Lines in Old File: 475
 - Comment Lines in New File: 475
 - Blank Lines in Old File: 761
 - Blank Lines in New File: 761
 - Source Code Lines in Old File: 9132
 - Source Code Lines in New File: 9132
 - Same lines of code: 8561
 - Same lines of comments: 475
 - New lines of code: 285
 - New lines of comments: 0
 - Deleted lines of code: 285
 - Deleted lines of comments: 0
 - Changed lines of code: 0
 - Changed lines of comments: 0

At the bottom of the screen, there are again navigation links for 'HOME | BLOG' and 'FAQ | HELP'.

Figure 12 – View Quick Report Screen

View Past Reports

To view reports that were created in the past, select the **View Past Reports** hyperlink from the **Reports Screen**. This will take you to the **View Past Reports Screen**, where you may select by name; any of your reports created in the past (see Figure 13). After you select a past report from the Session pull-down menu, click on the **Get Report** button and your report will be displayed (Figure 12).

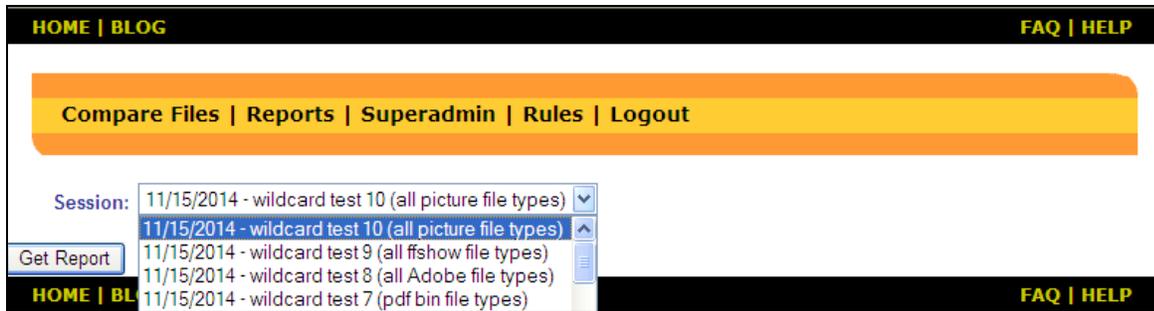


Figure 13 – View Past Report Screen

Export Data to File

EZ-Metrix is able to create a delimited export file from any report. This makes offline analysis, summarization and graphing of measurement data much easier, by allowing the import of this data into Microsoft Excel, or other analytical software.

In order to export the contents of a report to a file, select the **Export Data to File** option from the **Reports Screen** (Figure 11). Select the desired report from the **Session** pull-down menu item and click on the **Get Data** button (Figure 14).

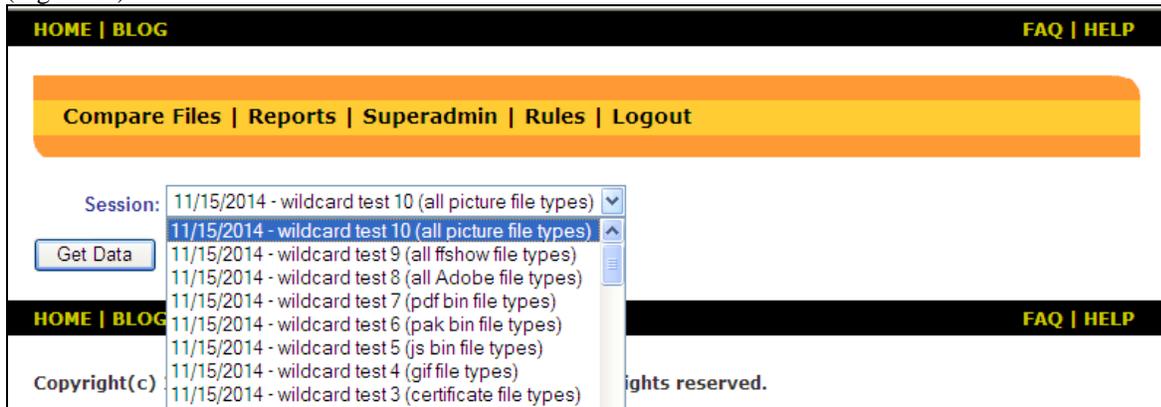
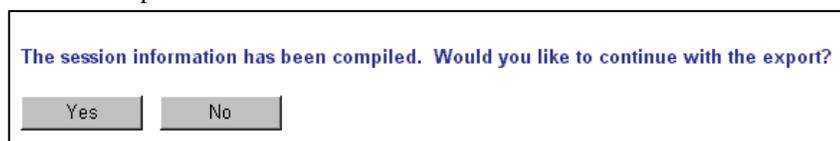


Figure 14 – Export Report Screen

You will be asked to confirm this action before the export takes place. Click on the **Yes** button to continue, or the **No** button to cancel this operation.



When **Yes** is selected, a dialog box is presented to allow you to select a name and location of the resulting export file (Figure 15). The file type must be **Text File (*.txt)** when exporting a report (you may rename it later).

You may specify the name of the file with which to save your report. The report will be saved in a delimited format, where the vertical bar character (i.e., “[|]”) is the delimiter character.

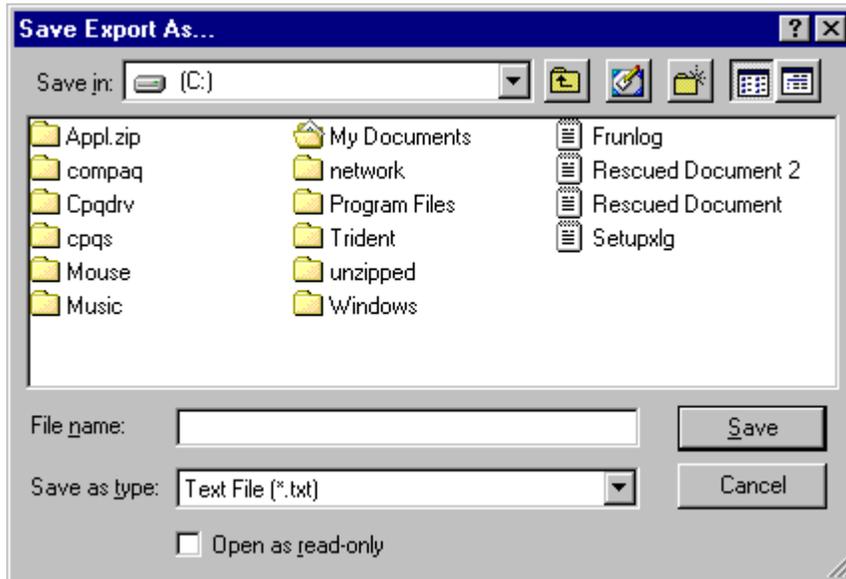


Figure 15 – Export Report Save-As Dialog Box

When a file name and location are provided, click the **Save** button and a confirmation screen will be displayed when the file is saved to the location specified. Click **OK** to return to the Reports Screen (Figure 11).



Importing to Excel

To import the resulting file into Excel, launch Excel and select the **File/Open** command then select the file you named above. Follow Excel’s instructions to import the delimited file (“|” is separator character).

When the file has been successfully imported (Figure 16), it can be formatted and saved in native Excel format, graphed (Figure 17), or prepared for importing into another application.

	A	B	C	D	E	F
1	comparedate	sessionid	sessionname	ruleid	comparetype	directorypath
2	7/17/04	502	Admin single file	C	Physical Line Count	F:\My Documents\EZ-Metrix\Tes
3						
4						
5	filename	commentlinesinfile	blanklinesinfile	sourcelinesinfile	totallinesinfile	
6	atod.c	80	75	115	270	
7	aux3.c	207	103	193	503	
8	AUX4.C	120	51	104	275	
9	AUX5.C	155	86	188	429	
10	auxadc.c	121	74	176	371	
11	auxiliary.c	304	219	750	1273	
12	cfgmod.c	144	24	45	213	
13	cnfgbits.c	85	20	16	121	
14	crc16.c	24	12	71	107	
15	crc16_O.c	24	12	71	107	
16	eacCRC16.c	149	7	51	207	
17	ecb.c	40	12	61	113	
18	ecbcnfg.c	81	22	17	120	
19	ecbstate.c	16	14	42	72	
20	ecbu.c	240	111	1008	1359	

Figure 16 – Report Imported to Excel

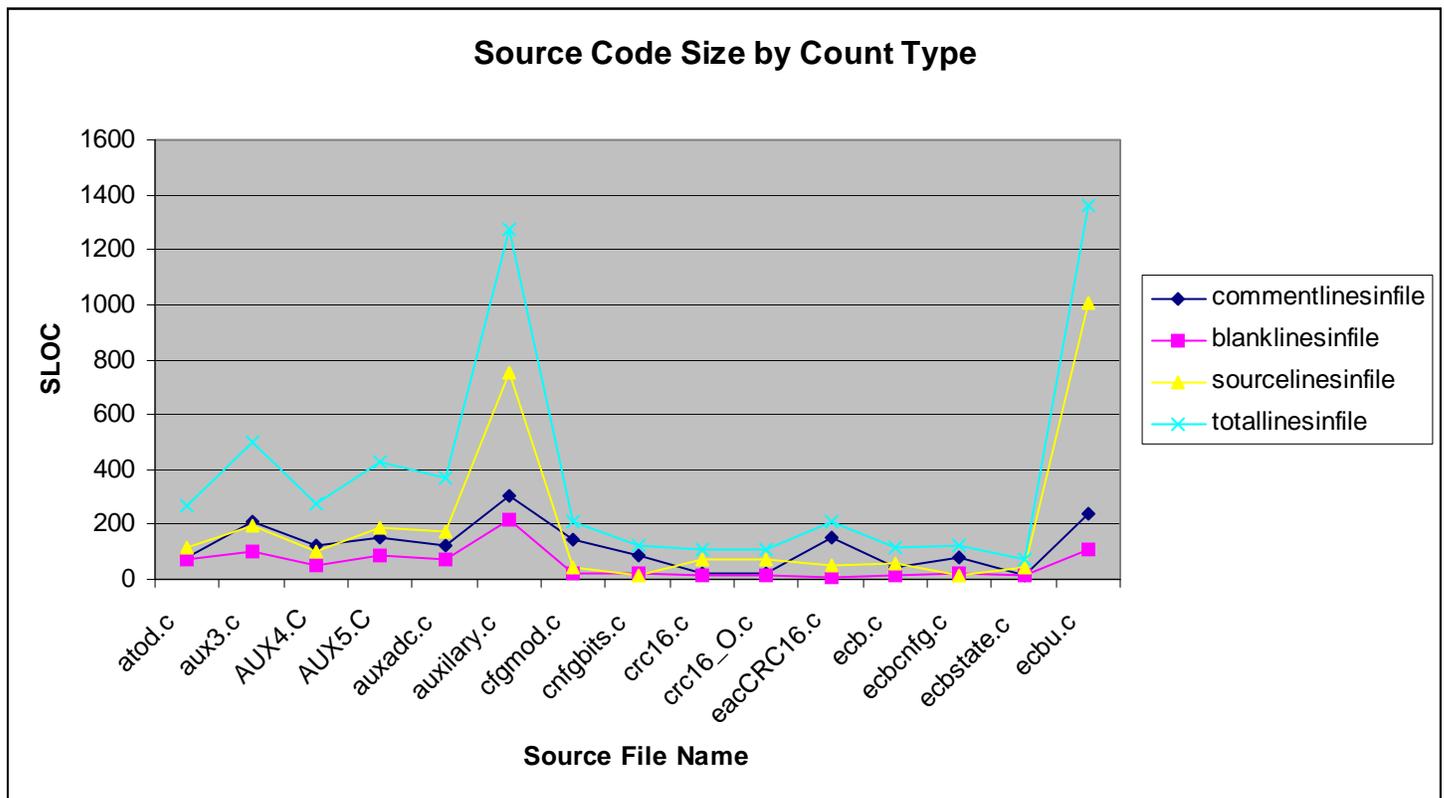


Figure 17 – Report Graphed by Excel

Creating Rules

EZ-Metrix is very flexible, and can accommodate many programming languages through the use of a simple rules engine. Rules are established in order to instruct EZ-Metrix how a given language delimits comments from code, and allow you to decide how much of a change to a line of code constitutes a new line. Some common languages and their typical rule definitions are included for your convenience in Appendix B – Typical Rule Settings by Language.

If you wish to create a new rule, click on the **Rules** link item from the main menu (see Figure 5), and you will be presented with the rules page (Figure 18). New rules are typically created in order to support new languages or dialects.

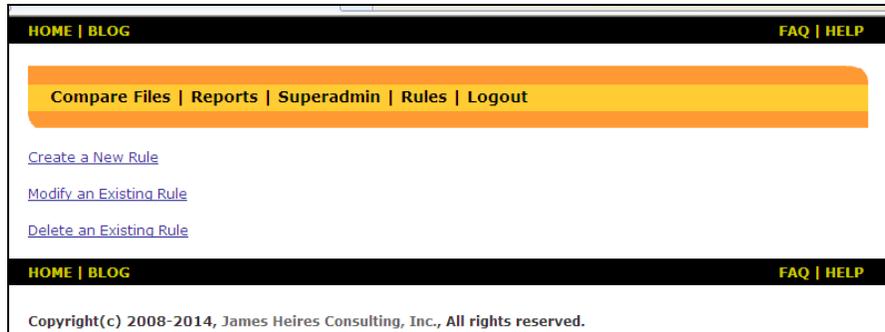


Figure 18 – Rules Screen

Selecting **Create a New Rule** allows you to specify a new rule to suit your particular needs (Figure 19). Each rule requires a name, and a difference threshold as a minimum. Optional fields are the single line comment character string and beginning and ending multi-line comment strings.

Figure 19 – Create a New Rule Menu

When your new rule has been fully defined, click on the **Create New Rule** button and the confirmation screen is displayed. The newly created rule is immediately available for use in a measurement session.



Modifying Rules

When you wish to change an existing rule, select **Modify an Existing Rule** from the Rules Menu (Figure 18). You are then presented with a screen where you must choose a rule to modify (Figure 20).

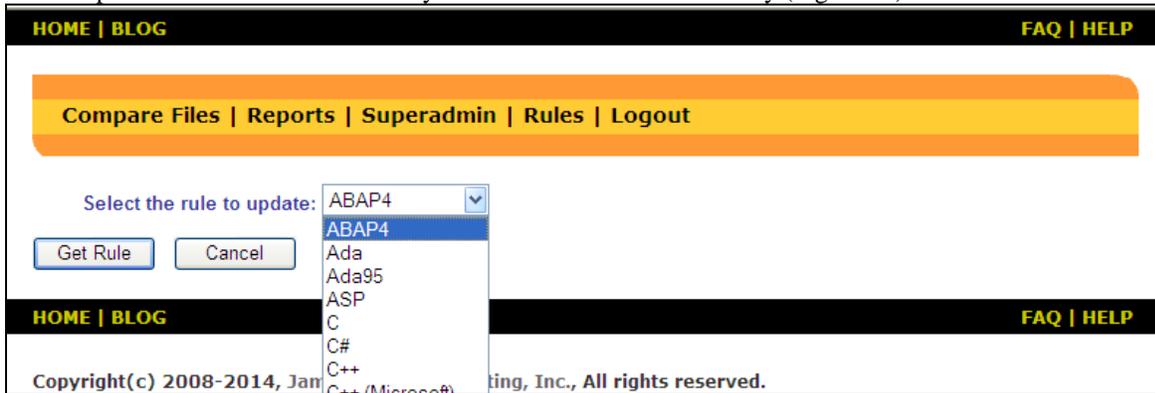


Figure 20 – Modify an Existing Rule Screen

Once a rule has been selected, click on the **Get Rule** button and the Modify an Existing Rule Detail screen is displayed (Figure 21).

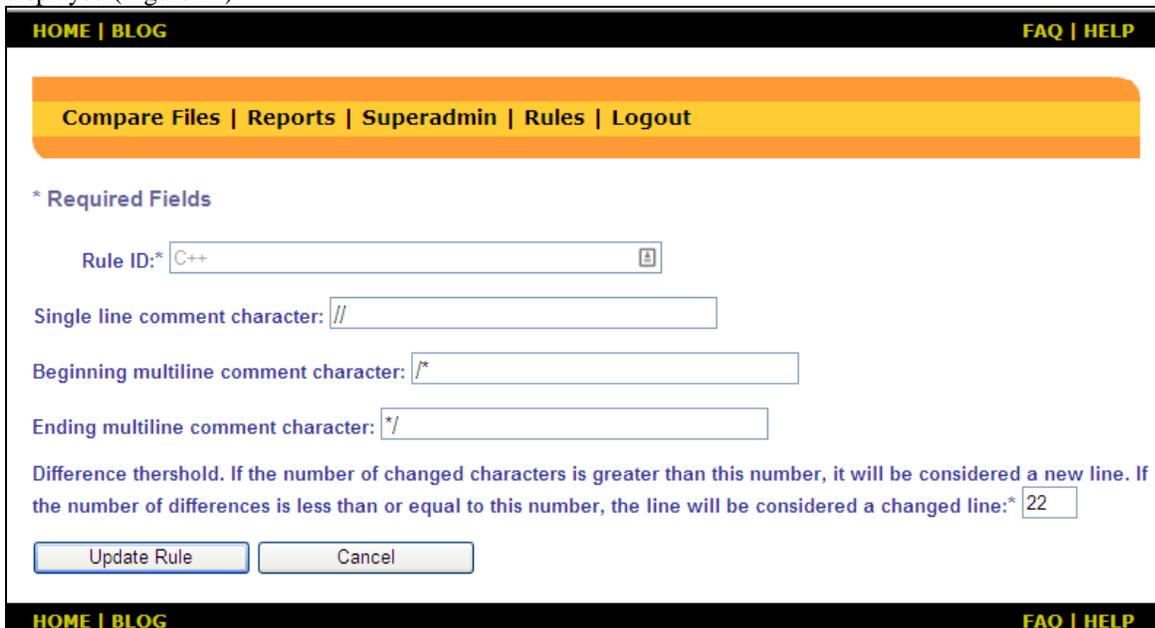


Figure 21 – Modify an Existing Rule Detail Screen

When the changes to the rule have been updated, click on the **Update Rule** button and a confirmation message appears.



Purge Data from Database

From the **Reports** screen (Figure 11) a user may purge all data associated with the user and their entire organization, by selecting the **Purge Data From Database** hyperlink. When this option is selected, a confirmation screen is displayed (**Error! Reference source not found.**). Clicking **Yes** at this point will delete all historical data that is associated with this user. This includes all reports, all file and directory data, session information and rules.

WARNING: This is a non-reversible command, and will result in data from all users in the organization being PERMANENTLY deleted from the server. There is no way to recover this information once it has been deleted! It is highly advised for users to back up their data using the export feature (Export Data to File) prior to purging data from the database.

Are you sure you want to purge your file data, directory data, session data, and rules?

If **Yes** is selected, a confirmation screen is displayed, informing the user that the entire database for this organization has been deleted.

If **No** is selected, the **Reports** screen is displayed.

Data purge successful.

4. How EZ-Metrix Works

Directory Results – Non-Comparison

The directory results measure results at the file level.

Total Files in Directory

This is a simple count of the number of files measured in the selected directory.

File Results – Non-Comparison

File results are those measures that pertain to the measurement of a single list of source files.

Total Lines in File

The total lines measurement for a given file is defined by the sum total number of physical lines of code, comments and blank lines. This measurement serves as a foundation upon which the other measures (defined below) are based.

$$\text{Total Lines in File} = \text{Lines of Code} + \text{Comment Lines} + \text{Blank Lines}$$

Comment Lines

Comment lines are those defined by the rules in use during the measurement session. Rules may be created by the user in order to determine where a comment begins and/or ends. EZ-Metrix utilizes these rules to separate lines of code from comments, and measures these separately. If a comment is on the same line as code, the line will be considered a line of code, and will not be considered a comment line. If the comment is on a line without code, it will be considered a comment line. If a blank line is embedded within a multi-line comment, it will be counted as a comment line, not a blank line.

EZ-Metrix reduces the total number of physical lines in the file by the number of comment lines in each source file, and retains the number of comments as a separate measurement.

Blank Lines

A Blank line is defined as a line with nothing on it but a carriage return, and not surrounded by multi-line comment delimiters (e.g., not embedded within a comment).

EZ-Metrix reduces the total number of physical lines by the number of blank lines in each source file, and retains the number of blank lines as a separate measurement.

Source Code Lines

A source code line is defined by those lines which are not comments or blanks (see above for definitions). In other words:

$$\text{Source Code Lines} = \text{Total Lines in File} - \text{Comment Lines} - \text{Blank Lines}$$

Directory Results - Comparison

The directory results measure results at the file level.

Same Files

The number of source files which have remained unchanged, as compared to the old (i.e., baseline) source file list. Files are considered the same if the new and old filenames are identical. This measurement is produced and reported once for each comparison session.

Deleted Files

The number of source files which have been deleted from the old (i.e., baseline) source file list. This measurement is produced and reported once for each comparison session.

New Files

The number of source files which have been added to the old (i.e., baseline) source file list. This measurement is produced and reported once for each comparison session.

File Results – Comparison

These file results are those measures that pertain to the comparison measurement of a list of source files.

New Lines of Code

The number of lines of source code (see definition above) which have been added to the old (i.e., baseline) source file. This measurement is produced and reported for each pair of source files provided to EZ-Metrix for comparison purposes. Note: a pair of source files is defined as those with identical filenames.

Deleted Lines of Code

The number of lines of source code (see definition above) which have been removed from the old (i.e., baseline) source file. This measurement is produced and reported for each pair of source files provided to EZ-Metrix for comparison purposes.

Same Lines of Code

The number of lines of source code (see definition above) which remain unchanged (are identical to each other), as compared to the old (i.e., baseline) source file. This measurement is produced and reported for each pair of source files provided to EZ-Metrix for comparison purposes.

Changed Lines of Code

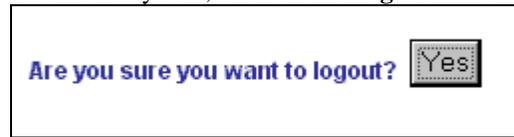
The number of changed (i.e., modified) lines, as compared to the old (i.e., baseline) source file. A changed line is defined by the difference threshold rule that establishes the number of mismatched characters (as a percentage) between old and new files in order to differentiate changed lines from those that have been deleted and replaced with a new line. If a line in the new source file has changed characters fewer or equal to the threshold (as a percentage of the old file), the line is counted as changed. A changed character may be one which is added, modified or deleted. The percentage of change is determined (new to version 4.1.0.3) using the Levenshtein-Distance algorithm.

For example, if you set the threshold to 5%, and compare two files where a 100-character long line is modified by adding 5 or fewer characters, EZ-Metrix will count this line as a changed line. If, however, 6 characters were added to an existing 100-character long line, EZ-Metrix counts this line as both a new and a deleted line.

When the comparison is performed according to this rule, EZ-Metrix measures how many lines have changed between the compared source files. This measurement is produced and reported for each pair of source files provided to EZ-Metrix for comparison purposes. Changed lines apply equally to both lines of code as well as lines of comments. For lines which contain both code and comments, the length of the line includes both code and comments.

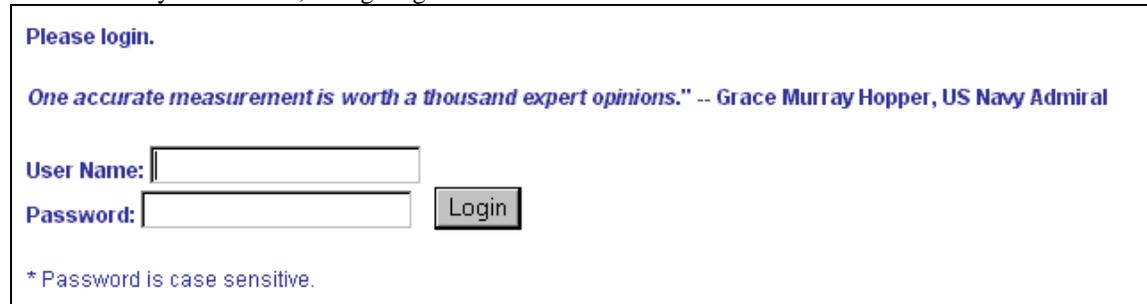
5. Logging out of EZ-Metrix

To exit the system, click on the **Logout** link and you are presented with a confirmation screen.



Are you sure you want to logout?

If you choose to exit the application you are presented with the home page once again (Figure 22). At this point, it is safe to exit your browser, or login again to start a new session.



Please login.

One accurate measurement is worth a thousand expert opinions." -- Grace Murray Hopper, US Navy Admiral

User Name:

Password:

* Password is case sensitive.

Figure 22 – Login Screen

6. Conventions

Several conventions are used by EZ-Metrix to ensure high quality results and a pleasant user experience. The user should understand these rules, in case the system behaves in a manner that raises questions in the mind of the user.

Unique Session Name

If a session name is provided to the system, it must be unique for each day of system use. If, for example, within a single day, a user names a session “Session #1” then later that same day chooses the same name for another measurement session, the system will produce an error message. The user will be forced to change the session name of the second instance, so that it is unique for that day. If the session name is left blank, the system assigns a unique session name for each session (Current date and time).

Session Time-out

For security reasons, after a period of inactivity, your EZ-Metrix session will automatically time out. When this happens, any feature selected will result in the Login Screen to be displayed (Figure 2). If you would like to continue working, you will first have to login to EZ-Metrix before proceeding.

7. Minimum System Configuration

Before you get started with EZ-Metrix, your computer must satisfy these minimum system configuration requirements:

Operating Systems

- Windows 98SE
- Windows Me
- Windows 2000 SP2 or higher
- Windows XP with or without SP1
- Windows 7 or later.

Browsers

- Microsoft Internet Explorer 5.5 with Service Pack 1 or higher
- Microsoft Internet Explorer 6.0 with or without Service Pack 1
- Microsoft Internet Explorer 8 or later
- Google Chrome with IETab add-in (or equivalent) installed.

Trusted Site

In order to use EZ-Metrix, you must first setup your IE browser to trust the EZ-Metrix website. See **Error! Reference source not found.** for details.

Active Internet Connection

In order to log in and use the EZ-Metrix system, you must be connected to the EZ-Metrix website. EZ-Metrix requires this connection to authenticate users and to store measurement reports and rules on the server

Administrator Rights on Workstation

Depending upon your operating system, you may need to have administrator rights on the workstation that will be downloading the ActiveX application components. If the ActiveX components are not downloaded, the system will not operate correctly.

8. Getting Help

On-line Help

EZ-Metrix has an on-line help system that is available at any time. To use the help system, click on the **Help** link **| HELP** which is located in the upper-right portion of every screen.

The help system is displayed, showing numerous topics of helpful information, covering every major system function (Figure 23). When finished with the help system, click on any of the other menu items to invoke other system functions.

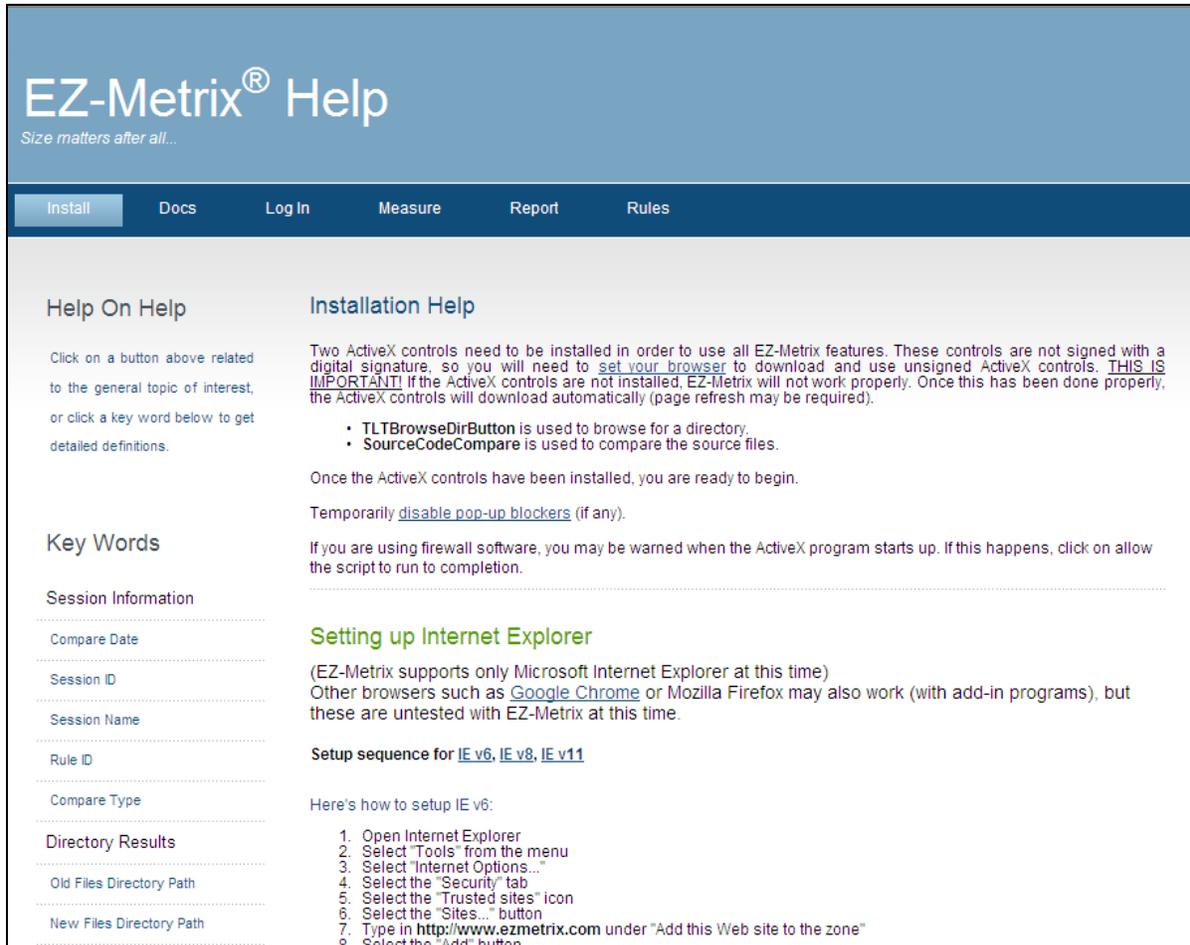


Figure 23 – Help System

Email support

In case the on-line help doesn't answer your questions, licensed users may request support via email. Send a detailed description of your symptom or question to: info@jamesheiresconsulting.com. Within a short time period, you will get a response via email.

9. Appendix A – Supported Languages

1. ABAP	21. dosbatch	42. Makefile	63. sdl
2. Ada	22. Expect	43. MUMPS	64. sed
3. ALGOL	23. fit	44. mySQL	65. SGML
4. ALGOL 60	24. flex	45. nmake	66. shell
5. antlr	25. Forth	46. Objective-C	67. SPARK
6. as	26. FORTRAN 90	47. Oracle	68. spock
7. asp	27. Go	48. PADL	69. SQL
8. Assembly	28. Haskell	49. Pascal	70. TCL
9. awk	29. HTML	50. pdpas	71. TMS (testscripts - ts)
10. bash	30. humdrum	51. Perl	72. UNIX shell
11. BASIC	31. IFDL	52. Perl5	73. VB Class
12. bison	32. Java	53. PHP	74. VB Form
13. Bourne shell and variants	33. Javascript	54. pike	75. VB.NET
14. C (ANSI)	34. JOVIAL	55. PL/SQL	76. VBA
15. C shell	35. Jscript.NET	56. PL1	77. Visual Basic
16. C#	36. jsp	57. PLi	78. Visual C++
17. C++ (Msft)	37. leap	58. PowerBuilder	79. Visual Studio.NET
18. ColdFusion	38. lex	59. prl5 (PRL 5.0)	80. XML
19. Delphi	39. lisp	60. ps	81. Yacc
20. DHTML	40. LR	61. Python	
	41. make	62. Ruby	

10. Appendix B – Typical Rule Settings by Language

Language	Single Line Comment Character	Beginning Multiline Comment Character	Ending Multiline Comment Character
ABAP	*		
Ada83	--		
ALGOL		comment	;
ALGOL 60	;		
Antlr	//	/*	*/
As	#		
Asp	'	<!	-->
ASP		<!	>
Assembly	;		
Awk	#		
Bash	#		
BASIC	rem		
Bison		/*	*/
Bourne shell	#		
Bourne shell	:		
C (ANSI)		/*	*/
C shell	#		
C#	//	/*	*/
C++ (Msft)	//	/*	*/
ColdFusion	<!--	<!--	---->
Delphi	//		
DHTML		<!--	-->
Dosbatch	rem		
Expect	#		
Fit	#	#[]#
Flex	--	{	}
Forth		()
FORTRAN 90	!		
Haskell		{-	-}
HTML		<!--	-->
Humdrum	#		
IFDL		/*	*/
IFDL		{	}
Java	//	/*	*/
JavaScript		<!--	//-->
JOVIAL		comment	;
Jscript.NET	//	/*	*/
Jsp	//	<%--	--%>
Jsp	//	/*	*/
Leap		/*	*/
Lex		%{	%}

Language	Single Line Comment Character	Beginning Multiline Comment Character	Ending Multiline Comment Character
Lex		/*	*/
Lisp	;	#	#
LR	&C		
Make	#		
Makefile	#		
MUMPS	#		
MySQL	--		
MySQL	#		
Nmake		/*	*/
Objective-C	//	/*	*/
Oracle	--	/*	*/
PADL	%		
Pascal		{	}
Perl	#		
perl5	#		
PHP	// or #	/*	*/
Pike		/*	*/
PL/SQL	--	/*	*/
PL1		/*	*/
Pli		/*	*/
PowerBuilder	//	/*	*/
Python		<%--	--%>
Python	#		
Ruby	#	=begin	=end
Sdl		/*	*/
Sed	#		
SGML		<!	>
Shell	#		
SPARK	--		
Spock	!		
SQL	--	/*	*/
TCL	#	{	}
TCL/TK	#		
TMS	#	/*	*/
UNIX shell	#		
Visual Basic	'		
VB.NET	'		
VB.NET	REM		
Vbscript	'		
Vbscript	REM		
Visual C++	//	/*	*/
XML		<!--	-->
Yacc		/*	*/