Code Inspection

Summary

This guide discusses the code inspection feature based on defined rules, notifies identified error and dangerous factors

Description

Using Code Inspection Implementation tool, developer's source code can be inspected when applying eGovFrame. Source code inspection can increase developers' convenience and efficiency by identifying errors and dangerous factors.

Code Inspection provides following features

Main Fuction	Description
Syntax Error Inspection	It provides the function to inspect syntax errors in written source codes.
Logical Error Inspection	It provides the function to inspect possible errors in written source codes.
Reference Inspection	It provides the function to inspect unused parts in written source codes.
Reporting	It provides the function to provide result from inspections as Excel and HTML document format.
Rule C ustomizing	It provides the function to add newly defined rules using the API that defines the rule.

PMD[<u>http://pmd.sourceforge.net/]</u> was chosen as the Code Inpection tool for eGovFrame out of other various open source inspection tools. This is distributed as PMD Plugin for eGovFrame IDE.

eGovFrame Standard Inspection Rule Set

Rule is basis for Code Inspection using PMD, eGovFrame summarizes eGovFrame Standard Inspection Rule Set out of rules provided by PMD.

eGovFrame Standard Inspection Rule consists of following 39 rules. Refer to eGovFrame Standard Inspection Rule Set for detailed information.

No.	Rule name	Description
01	EmptyC atchBlock	Empty Catch Block found
02	EmptyIfStmt	Empty if Statement found
03	EmptyWhileStmt	Empty while Statement found
04	EmptyTryBlock	Empty try Block found
05	EmptyFinallyBlock	Empty finally Block found
06	UnnecessaryC onversionTemporary	Unnecessary Temporary Conversion found when default data type is changed to String
07	EmptyStatementNotInLoop	Empty Statement (;) found
08	WhileLoopsMustUseBraces	Use of while loops without braces is discouraged
09	AssignmentInOperand	Assignment in Operand found. It increases code complexity and decreases readability.
10	UnnecessaryParentheses	Unnecessary Parentheses found. It decreases readability.
11	SimplifyBooleanExpressions	Avoid unnecessary boolean compare statement
12	SwitchStmtsShouldHaveDefault	Default label is required in Switch statements
13	AvoidReassigningParameters	Reassignment on method parameters found.
14	FinalFieldC ouldBeStatic	Set final field to static to reduce overhead
15	EqualsNull	Equals method used with null
16	SimpleDateFormatNeedsLocale	Use Locale creating SimpleDateFormat instances
17	ImmutableField	Set Final to allocated variable created by constructor
18	AssignmentToNonFinalStatic	Static field can be used in unsafe manner
19	AvoidSynchronizedAtMethodLevel	Use of block level synchronization is encouraged than that of mothod level synchronization
20	AbstractC lassWithoutAbstractMethod	No Abstract Method found in Abstract Class
21	UncommentedEmptyMethod	Add Comment to Empty methods
22	AvoidC onstantsInterface	Use Interface to implement Class behavior only
23	DuplicateImports	Duplicate Import found
24	ImportFromSamePackage	Unnecessary import statement found within the same package
25	SystemPrintln	System.out.print is used. Exclusive logger is recommended.
26	VariableNamingC onventions	Only final variables are allowed to have underscore
27	MisleadingVariableName	non-field name begins with m_ ' found
28	AvoidArrayLoops	Use System.arraycopy() method instead of looping to copy array values, it's more efficient and fast.
29	UnnecessaryWrapperObjectC reation	Unnecessary Wrapper Object found. Delete specified code, and use of special parse method is recommended
30	AvoidThrowingRawExceptionTypes	Throwing raw Exception is discouraged
31	AvoidThrowingNullPointerException	NullPointerException throwing is discouraged
32	StringInstantiation	Unnecessary String Instance Creation code found. Make the code simpler
33	StringToString	toString() method used to String object. Remove specified code.
34	InefficientStringBuffering	Direct join by non-string operation within StringBuffer function found. Use append method instead.
35	InefficientEmptyStringC heck	Avoid using String.trim().length() to check empty string. Implement special logic tocheck whitespace/Non-whitespace.
36	UselessStringValueOf	String.valueOf function is unnecessary when appending String.
37	UnusedPrivateField	Unused Private Field found

38	UnusedPrivateMethod	Notify Unused Private Method declaration
39	UnusedFormalParameter	Notify Usused parameter in method declaration
-		

Installation

You can install PMD, an eGovFrame inspection tool, via either following two methods.

- Download the Eclipse IDE (eGovFrame Implementation Tool), and check the included PMD
- Using Software Updates feature in the Eclipse IDE

Check PMD included in the eGovFrame implementation tool

You can download the eGovFrame implementation tool from the eGovFrame online support portal [http://www.egovframe.go.kr]. Browse to Download > Development Environment > Implementation Tool. Unarchive the downloaded file, run and follow steps below to check a PMD version.

1. Select Help > About Eclipse in Eclipse IDE Menu.

Help	
🚳 Welcome	
Help Contents Search Dynamic Help	
Key Assist Tips and Tricks Report Bug or Enhancement Cheat Sheets	Cul+Shift+L
Hoport Maven Issue Check for Updates Install New Software Eclipse Marketplace	
About Eclipse	

2. Click the Installation Details button in the About Eclipse window.



3. Review the PMD Plug-in item and version in the Plug-in list of About Eclipse Plug-ins window.

Sig	Provider	Plug-in Name 👻	Version	Plug-in Id
9 -	Eclipse.org	Refactoring Core	3.5.101.r362_v	org.eclipse.ltk.core.i
9=	Eclipse, org	Readme File Editing Tool	3, 3, 100, 1201005,	org,eclipse,ui,exam
9::	Eclipse, org	R21 Presentation Plug-in	3, 2, 200, 1201005,	org.eclipse.ui.prese
Q -	Eclipse, org	Proxy for Windows	1,0,100,1201005,	org.eclipse.core.net
Q ::	Eclipse.org - Equinox	Provisioning Garbage Colle	1.0.100.v20100	org.eclipse.equinax.
9::	Chomakichi	PropertiesEditor asian NLS	0,1,0	jp.gr,java_conf,ussiy
Q -	Chomakichi	PropertiesEditor	5,3,5	jp.gr.java_conf.ussiy
1	PMD Project	PMD Plug-in	3.2.6.y2009033	net.sourceforge.pmc
9:	Eclipse, org	Plug-in Development Envir	3,6,2,R36x_201,	org,eclipse,pde,build
9::	Eclipse, org	PDE User Guide	3,6,2,v2010111,	org,eclipse,pde,doc
¥	Eclipse.org	PDE UI	3.6.1.v2011021	org.eclipse.pde.ui
9:	Eclipse, org	PDE UA UI	1, 0, 100, v20100,	org,eclipse,pde,ua,u
91	Eclipse, org	PDE UA Core	1,0,100,v20100,	org,eclipse,pde,ua,c
Q =	Eclipse, org	PDE Templates	3, 4, 200, v20100,	org, eclipse, pde, ui, te
Q.	Eclipse.org	PDE Runtime	3.4.200.v20100	org.eclipse.pde.runt
9 ::	Eclipse, org	PDE Launching Support	3, 6, 0, v20100601	org,eclipse,pde,laur
9 -5	Eclipse, org	PDE JUnit Runtime Support	3, 4, 100, v20100,	org.eclipse.pde.junit
Q =	Eclipse.org	PDE DS UI	1.0.100.v20100	org.eclipse.pde.ds.u
9 ::	Eclipse, org	PDE DS Core	1, 0, 100, v20100,	org.eclipse,pde,ds.c
9::	Eclipse, org	PDE Core	3,6,2,v2011021,	org.eclipse,pde,core
¥	Eclipse.org	PDE	3.6.1.v2011021	org.eclipse.pde
Q ::	www,example.org	Pannotation Model	1, 1, 2, v2010061,	org.eclipse.emt.tene
¥::	Eclipse.org - Equinox	p2 query language	2, 0, 0, v20100503a	org, eclipse, equinax,
9.5	Eclipse.org - Equinox	OSGI System Bundle	3, 6, 2, R35x_v20,	org.eclipse.osgi
Q.::	Eclipse.org - Equinox	OSGI Release 4.2.0 Utility C	3.2.100.v20100	org.eclipse.osgi.util
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Using Software Updates feature in Eclipse IDE

PMD installation using Software Updates feature in Eclipse IDE is the same as Update Section. Please refer to the description and proceed to initial PMD installation.

Preferences

You can apply the eGovFrame standard Inspection RuleSet to PMD Plug-in via the preference in the Eclipse IDE, follow steps below.

Apply the eGovFrame Standard Inspection RuleSet

- 1. Get the eGovFrame Standard Inspection RuleSet via following 2 ways.
 - Archive file of Standard Inspection RuleSet Korean/English version
 - Browse to eGovFrame online support portal, and download the file from Download > IDE > Implementation Source Code.
- 2. Unarchive the downloaded file.
- 3. Select Window > Preferences in menu of the Eclipse IDE

Window Help	
New Window	
New <u>Editor</u>	
Open Perspective	•
Show Yew	•
Customize Perspective	
Save Perspective <u>A</u> s	
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Close All Perspectives	
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Preferences	

4. Select PMD > Rules Configuration in menu pane at the left side of the Preferences window.

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≣- Ant	Bule set name	Bule name	Si	Priority	Description 🔥	
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E- Data Management	Basic Buler	AvoidMultipleUnaryOperators	42	Error	Using multiple unary operator	Editrole
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- Instal/Update	Basic Rules	AvoidUsindHardCodedIP	4.1	Warning high	An application with hard code	Add rule
Interrated Agent Controller	Basic Rules	AvoidUsingOctaValues	3.9	Warning high	Integer literals should not star	
L Java	Basic Rule:	BigIntegerInstantiation	3.9	Warning high	Don't create instances of alre	Import rule set
l lausCaint	Basic Rules	BooleanInstantiation	1.2	Error	Avoid instantiating Boolean o	Event when the set
P Javas Lipu	Basic Rules	BrakenNulCheck	3.B	Error	The null check is broken sind	Export rule set
JUT Weaving	Basic Bulez	CheckResulSet	4.1	Warning high	Always check the return of or	Clear all
JFA	Basic Rules	ClassCastExceptionWithToArray	3.4	Warning high	if you need to get an array of	bibar ar
- Maven	Basic Rulez	Collepsible/Statements	31	Warning high	Sometimes two if statements	
 Plug-in Development 	Basic Rules	DoubleCheckadLocking	1.D4	Error high	Partially created objects can	
- PMD	Basic Ruler	EmptyCatchBlock	01	Warning high	Empty Cetch Block linds inst	
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5. Click the "Clear all" button

6. Click OK in the PMD Confirmation dialog to delete all rules.

E PND Confirmation	×
All rules are to be deleted. Are you sure ?	
	OK Cancel

7. Click the "Import rule set..." button

8. In the PMD Plugin dialog, Click the Browse button and select the EgovInspectionRules_kor.xml file. (Korean version from the unarchived RuleSet files)

9. Check Import by Copy, then click OK.

🖶 PMD Plugin 🛛 🔀
Enter a rule xet or select a default one :
D: #Profiles#System#wanpyo# Browse
Import by Reference Vilmport by Copy
OK Cancel

10. Review a Rules grid list in the Preferences window for Imported rule.

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Validation Visualiser II- Web II- Web Services II- XDoclet						

11. Click OK in the Preferences window to apply newly imported rules.

Rules Configuration Description

Following table lists items that configure Rule Preferences of PMD Plug-in.

Configuration	Туре	Description
Rules	grid	Displays a list for all rules composing eGov Standard Inspection RuleSet
Remove rule	button	Delete selected rule from Rules grid
Edit rule	button	Edit selecte rule from Rules grid
Add rule	button	Add rule to Rules grid
Import rule set	button	Import rules from RuleSet file.
Export rule set	button	Export rules to file.
C lear all	button	Delete all rules in grid
Rule Designer	button	Launch external program for creating new rule in XPath (PMD Plug-in)
Rule properties	grid	Displays Key-Value typed property for specific rule, usually XPath query (XQuery) on Rules
Add property	button	Add new property to specific rule
Exclude patterns	grid	Displays exclude patterns list when applying whole RuleSet to a project
Include patterns	grid	Displays include patterns list when applying whole RuleSet to a project
Add Exclude Patterns	button	Add exclude patterns
Add Include Patterns	button	Add include patters

The description for Rules grid is provided in Register and Apply Custom Rules. Exclude/Include pattern is described below.

Exclude patterns

You can add exclude patterns by clicking the Add Include Pattern button as shown below.

Exclude patterns	Include patierna	
Exclude Pattern .7/main.java	Include Pattern	Add Exclude Pattern
		Add Include Pattern

A default pattern, '.*/PATTERN/.*', will be entered. You can change the pattern by double clicking it. The pattern in previous image means Inspection rule won't apply to all the files named main.java.

You can add include patterns by clicking Add Include Patterns button as shown below.

Exclude patterns	Include patterns	
Exclude Pattern	Include Pattern	Add Exclude Pattern
. Vinainijava	."/egow/."	Add Include Pattern

Default pattern, '.*/PATTERN/.*', will be entered. You can change the pattern by double clicking it. The pattern in previous image means the inspection rule will apply to all the files containing egov as a parent folder.

Update

You can update the latest version of PMD PMD in the Eclipse IDE. Following steps describe how to update.

1. Click Help > Install New Software in the Eclipse IDE Menu.



2. Click Available Software Sites link in 'Available Software' window.

3. Click the Add... button.

Preferences			<u>_ 0 ×</u>
type filter text	Available Software Sites		
type filter text General AmaterasERD AmaterasUML AmaterasUML AmaterasUML AmaterasUML AmaterasUML AmaterasUML Ant Constall/Update Available Software Sit Java EE Java Persistence JavaScript Maven Mylyn Plug-In Development PMD Remote Systems Run/Debug Server Softing Team Terminal Usage Data Collector Validaton Web	Available Software Sites	Location http://download.eclipse.org/releases/helios http://m2eclipse.sonatype.org/sites/m2e http://download.eclipse.org/tools/mylyn/upda http://download.eclipse.org/tools/mylyn/upda http://download.eclipse.org/eclipse/updates/S http://download.eclipse.org/webtools/reposito http://download.eclipse.org/webtools/reposito http://community.polarion.com/projects/subve http://coalhost:8080/update http://www.egovframe.go.kr/update http://findbugs.cs.umd.edu/eclipse	Add Edit Remove Reload Enable Import
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۲		OK	Cancel

4. Enter http://pmd.sourceforge.net/eclipse to Location in 'Add Site' window, then click OK.

O Add Site	×
Name: PMD	L <u>o</u> cal
Location: [http://pmd.sourceforge.net/eclipse]	Archive
OK	Cancel

- 5. URL is added to 'Available Software' list.
- 6. Select PMD for Eclipse 3 from the tree.

🥘 Install		<u>_ 0 ×</u>
Available Software Check the items that you wish to install,		(B)=
Work with: PMD - http://pmd.sourceforge.net/eclipse	Find more software by working with the <u>"Available S</u>	Add
type filter text		
Name	Version	
Select All Deselect All 1 item selected	3.2.6.v200903300643	
 ✓ Show only the latest versions of available software ✓ Group items by category ✓ Contact all update sites during install to find required software 	Hide items that are already installed What is <u>already installed</u> ?	
۲	< Back Next > F	inish Cancel

7. Click the Next button to start up the updating procedure.

Limitations of the "Update" installation

If you don't use eGovFrame Development Tool (downloaded from eGov standard framework online support portal) or updated PMD plug-in using Software Updates directly, following limitations may occur.

Limitations

Due to message hardcode in the source code on VariableNamingConventions rule of PMD, messages are displayed in English, even if the Korean version of standard Inspection RuleSet is installed.

Solution

- 1. Download a modified file from following path
 - Korean display fixed library file: Modified library file
- 2. Unarchive the downloaded file.
- 3. Replace the pmd14-4.2.5.jar file to the original library at the following
 - _ Original file path: %Eclipse directory%\plugins\net.sourceforge.pmd.eclipse.plugin_xxx\lib\pmdxx-x.x.x.jar (x denotes version)
- 4. Relaunch the Eclipse to apply a changed library file.