

Code inspection



Figure 1: Politecnico di Milano

Version 1.0

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Introduction

Purpose

The purpose of this document is to show all the problems found during the inspection of a small amount of code of a specific version of glashfish. The process of inspecting source code has two main purposes. The first and most obvious one is to enhance to quality of the code and eventually identify remaining bugs. The second purpose is to improve the coding skills of the team. The inspectors improve themselves by analysing code made by others and eventually discovering coding methods that they did not know. The original authors of the code receive a list of eventual mistakes that they could have done, which of course help them improving themselves.

Each group of the project has different methods assigned of a specific version of glashfish. We have to analyze these methods by checking that they are in agreement with every point of a given checklist. We also have to find other problems, then we have to report the problems found in this document.

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Scope

Glashfish is the official implementation of JEE. It is an open source project that uses svn as version system, in fact we used it to retrieve a specific version of glashfish: 64219 (of 16 Oct 2015 05:11).

This version is the version required by the assignment since we have been assigned some methods of this version to check.

Glashfish is a maven project, in fact we imported the pom file into IntelliJ IDEA and we used it and sonar to test some check of the checklist. **KEEP OR REMOVE?**

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Definitions, acronyms, abbreviations

- JEE: Java enterprise edition
- SVN: apache subversion, it is a version controller system, the successor of CVS **OR VCS?**
- CVS: Concurrent versions system, the first(/older/former/...?) version controller system **gilles : I don't think it's the firsts, it's a successor of SCCS (according to wikipedia)**
- Context: Contextual Information, it's a design pattern where the main information are stored inside one object and this object is used to pass everything

- Apache tomcat catalina: It's an opensource web server developed by apache foundation (not oracle) for and only for servlets.
- Servlet: A java program that runs on a dedicated web server, that is able to elaborate http requests and reply to them.
- MIME type: Multipurpose Internet Mail Extensions type. These are two-parts identifiers used to identify formats of content transmitted on the web.
- K&R style: Indentation style named after Kernighan and Ritchie, who used this style in their book "The C Programming Language". **WRITE acronyms find in the code**

Reference documents

- Assignment document: Code inspection.pdf
- Glashfish javadoc of this version: <http://glassfish.pompel.me/>
- Methods assigned to each group: <http://assignment.pompel.me/>

Document structure

- **Introduction:** this section introduces the inspection document. It contains a justification of his utility and indications on which parts are covered in this document.
- **Classes:** this section describes the classes and the methods that have been inspected
- **Functional role:** this section describes the functional role of the class from which the methods assigned belong to.
- **Issues list found by applying the checklist:** this section describes the issues found applying the checklist given.
- **Other problems:** this section describes other problems found that are not strictly related to the checklist.

Classes

All methods assigned to us belong to the same class.

StandardContext

Namespace: org.apache.catalina.core

Extends: ContainerBase

Implements: Context, ServletContext

Methods

- Line 5457 : contextListenerStop()
- Line 5509 : eventListenerStop()
- Line 5537 : mergeParameters()
- Line 5564 : resourcesStart()
- Line 5597 : alternateResourcesStart()
- Line 5635 : resourcesStop()
- Line 5662 : alternateResourcesStop()
- Line 5708 : loadOnStartup(Container children [])

Functional role

Javadoc

This class is the standard implementation of the *Context* interface. According to the javadoc it is:

A **Context** is a Container that represents a servlet context, and therefore an individual web application, in the Catalina servlet engine. It is therefore useful in almost every deployment of Catalina (even if a Connector attached to a web server (such as Apache) uses the web server's facilities to identify the appropriate Wrapper to handle this request). It also provides a convenient mechanism to use Interceptors that see every request processed by this particular web application. The parent Container attached to a Context is generally a Host, but may be some other implementation, or may be omitted if it is not necessary.

The child containers attached to a Context are generally implementations of Wrapper (representing individual servlet definitions).

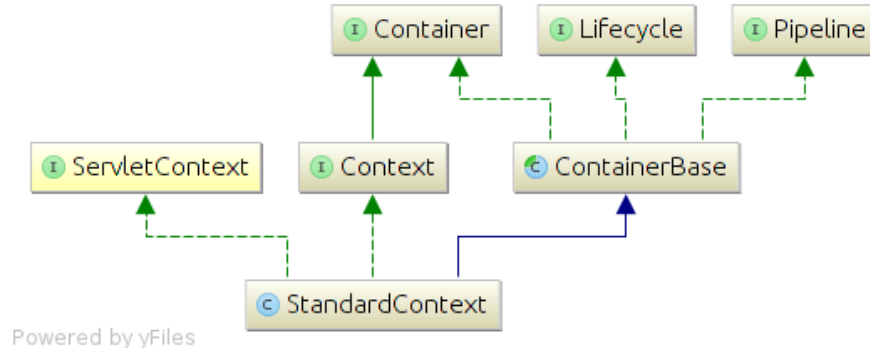


Figure 2: inheritance diagram

It extends *ContainerBase* that, according to javadoc, is:

A **Container** is an object that can execute requests received from a client, and return responses based on those requests. A Container may optionally support a pipeline of valves that process the requests in an order configured at runtime, by implementing the **Pipeline** interface as well.

And implements *ServletContext* that is a standard *javax* interface that defines the basic methods to build a context for Servlets such as *addServlet*, *createListener* and so on.

According to the javadoc it is:

Defines a set of methods that a servlet uses to communicate with its servlet container, for example, to get the MIME type of a file, dispatch requests, or write to a log file.

There is one context per “web application” per Java Virtual Machine. (A “web application” is a collection of servlets and content installed under a specific subset of the server’s URL namespace such as */catalog* and possibly installed via a *.war* file.)

In the case of a web application marked as “distributed” in its deployment descriptor, there will be one context instance for each virtual machine. In this situation, the context cannot be used as a location to share global information (because the information will not be truly global). Use an external resource like a database instead.

Usages

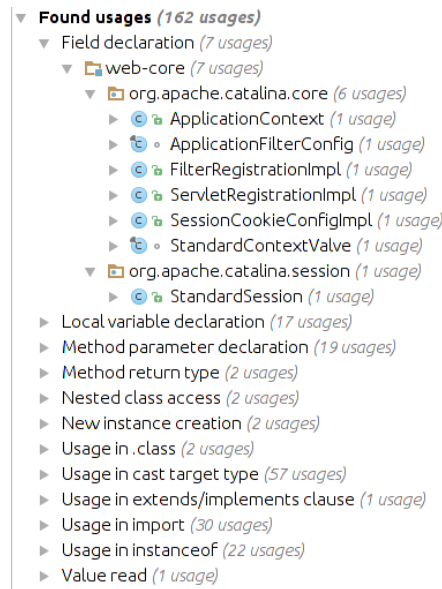


Figure 3: Usages

It is used in a lot of classes. In particular it is used as private property in catalina core classes.

For example we see that it is used by *ApplicationContext* that uses it to add

everything, such as new servlet (*addServlet* on line 672 of *ApplicationContext*).
N.B. there is only one instance of *StandardContext* inside *ApplicationContext*:
‘one context per “web application” ’

Role

Usages and javadoc suggest us that this class is very important because it can be seen as the standard “manager” of apache tomcat catalina (that is a servlets server). In fact this class belongs to an host implementation (that uses it to manage all features inserted at high level) and it contains the servlets.

In fact in the *context pattern* (Contextual Information) we have a main class context that contains the main information, in this case it contains the servlets, and it refers or allows to modify the requests or responses via interceptors (in fact it extends *ContainerBase*).

The *context pattern* is very useful where there is a great amount of data. It is for example used in android applications to interact with the user. With this pattern you can manage a lot of features. From the usage side, features can be inserted dynamically via a single object, and from the creation side you can chose where to use these features simply by choosing the appropriate context (the appropriate web application in this case). All data must pass via the context.

TODO improve

TODO class diagram automatically generated?

Issues list found by applying the checklist

NamingConventions

- from class `RestrictedServletContextListener`
 - method `contextInitialized` should start with a verb (hint: `onContextInitialized`)
 - method `contextDestroyed` should start with a verb (hint: `onContextDestroyed`)
- method `backgroundProcess` should start with a verb (hint: `runBackgroundProcess`)
- field `count` is not meaningful (hint: `backgroundProcessCounter`)
- method `contextListenerStart` should start with a verb (hint: `notifyContextStarted`)
- method `contextListenerStop` should start with a verb (hint: `stopContextListening`)
- return value of method `contextListenerStop` is never used (hint: change to `void`)
- method `create` is not clear and it looks like a simple alias of the `init` method
- method `create` is not used (hint: delete it)
- method `engineBase` should start with a verb (hint: `getEngineBase`)
- method `eventListenerStop` should start with a verb (hint: `stopEventListening`)
- method `eventListenerStop` always return true (hint: change to `void`)
- method `filterStart` should start with a verb (hint: `startFilters`)
- method `filterStop` should start with a verb (hint: `stopFilters`)
- method `managerStart` should start with a verb (hint: `startManager`)
- method `managerStop` should start with a verb (hint: `stopManager`)
- method `resourcesStart` should start with a verb (hint: `allocateResources`)
- method `resourcesStop` should start with a verb (hint: `freeResources`)
- method `restrictedSetPipeline` should start with a verb (hint: `setPipeline`)
- method `restrictedSetPipeline` should be made accessible only to certain packages (hint: declare it as `protected` and give a `friendly` accessor from the child class)
- method `sessionCreatedEvent` should start with a verb (hint: `onSessionCreatedEvent`)
- method `sessionDestroyedEvent` should start with a verb (hint: `onSessionDestroyedEvent`)

- method `sessionRejectedEvent` should start with a verb (hint: `onSessionRejectedEvent`)
- method `sessionExpiredEvent` should start with a verb (hint: `onSessionExpiredEvent`)
- method `sessionPersistedStartEvent` should start with a verb (hint: `onSessionPersistedStartEvent`)
- method `sessionPersistedEndEvent` should start with a verb (hint: `onSessionPersistedEndEvent`)
- method `sessionActivatedStartEvent` should start with a verb (hint: `onSessionActivatedStartEvent`)
- method `sessionActivatedEndEvent` should start with a verb (hint: `onSessionActivatedEndEvent`)
- method `sessionPassivatedStartEvent` should start with a verb (hint: `onSessionPassivatedStartEvent`)
- method `sessionPassivatedEndEvent` should start with a verb (hint: `onSessionPassivatedEndEvent`)
- method `sessionListenerStop` should start with a verb (hint: `stopSessionListening`)

Indentation

- line 5479 start with a mismatching number of spaces
- line 5482 start with a mismatching number of spaces
- line 5486 start with a mismatching number of spaces
- line 5488 start with a mismatching number of spaces
- line 5625 start with a mismatching number of spaces

Braces

- single statement `if` without braces at line 5546

N.B.: K&R style is used.

File Organization

- line 5487 can be easily rewritten to not exceed 80 columns.
- line 5574 can be easily rewritten to not exceed 80 columns.
- line 5576 can be easily rewritten to not exceed 80 columns.
- line 5582 can be easily rewritten to not exceed 80 columns.
- line 5613 can be easily rewritten to not exceed 80 columns.
- line 5618 can be easily rewritten to not exceed 80 columns.

- line 5621 can be easily rewritten to not exceed 80 columns.
- line 5624 can be easily rewritten to not exceed 80 columns.
- line 5680 can be easily rewritten to not exceed 80 columns.
- line 5734 can be easily rewritten to not exceed 80 columns.
- line 5735 can be easily rewritten to not exceed 80 columns.

Wrapping Lines

Everything ok

Comments

- commented code without any visible reason from line 5704 to 5706

Java Source Files

Everything ok

Package and Import Statements

Everything ok

Class and Interface Declarations

Everything ok

Initialization and Declarations

- can be private at line 5564
- can be private at line 5597
- can be private at line 5635
- can be private at line 5662
- can be private at line 5708
- **event** not declared at beginning of the block at line 5465
- **len** not declared at beginning of the block at line 5467
- **msg** not declared at beginning of the block at line 5487
- **iter** not declared at beginning of the block at line 5514
- **sc** not declared at beginning of the block at line 5553
- **env** not declared at beginning of the block at line 5603

- `alternateWebappResources` not declared at beginning of the block at line 5680
- `key` not declared at beginning of the block at line 5719
- `list` not declared at beginning of the block at line 5720

Method Calls

Everything ok

Arrays

Everything ok

Object Comparison

Everything ok

Output Format

Everything ok

Computation, Comparisons and Assignments

- brutish programming from line 5467 to 5471 (replace with `Collections.reverse` on a list copy)
- brutish programming from line 5514 to 5516 (use `foreach`)
- brutish programming at line 5625 (use `varargs` instead of Object array)

Exceptions

- Exception 5619 is not logged

Flow of Control

Everything ok (there are no switches)

Files

Everything ok, no files

Other problems

- loadOnStartup: parameter “children” declared in C-style array 5708
- addEnvironment: never used
- addResource: never used
- addResourceLink: never used
- getStartupTime: never used
- getTldScanTime: never used
- setTldScanTime: never used
- redundant assignment at line 7498
- redundant assignment at line 7545
- redundant assignment at line 7559
- getState: should return an enum or a class
- field `tldScanTime` is not used
- setCompilerClasspath: never used
- getOriginalDocBase: never used
- isReplaceWelcomeFiles: never used
- setUnloadDelay: never used
- setUnpackWAR: never used
- getCharsetMapperClass: never used
- setCharsetMapperClass: never used
- addResourceParams: never used
- addServletMapping(ServletMap): never used
- findMappingObject: never used
- findMessageDestination: never used
- findMessageDestinations: never used
- findMessageDestinationRef: never used
- findMessageDestinationRefs: never used
- removeMessageDestination: never used
- removeMessageDestinationRef: never used
- managerStart: never used
- managerStop: never used
- getDefaultConfigFile: never used
- getResourceNames: never used
- getResourceLinks: never used
- addEnvironment: never used
- addResource: never used
- addResourceLink: never used
- getStaticResources: never used
- startRecursive: never used
- getStartTimeMillis: never used
- isEventProvider: never used

- isStatisticsProvider: never used
- setCachingAllowed: never used
- setCaseSensitive: never used
- setCaseSensitiveMapping: never used
- setCacheTTL: never used
- setCacheMaxSize: never used
- getAntiJARLocking: never used
- setAntiJARLocking: never used
- MessageFormat is often called with an Object array instead of using vararg.
- some 'if' have a space before '(', but other not, the same thing for other construct like 'catch'
- } catch(Throwable t) { **TODO explain**
 - 5619
 - 5648
 - 5483
 - 5580
 - 5675
 - 5685
- two occurrences of new Object[], this is not a good way **KEEP OR REMOVE?**

Used tools

- intellij IDEA: JAVA EE IDE
- sonar: useful tools to analyze code from style point of view
- Github: for version controller
- Gedit and ReText: to write Markdown with spell check

Hours of work

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