JEE Security Structure Part 1

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Contents

Chapter 1

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1.1 Introduction to Security Architecture

Most web applications have a few things in common:
They need to figure out who is the user that is using the application and what is he allowed to do and see.

A typical application has more than one security layer, it may be protected by only being available from a specified network or VPN. In addition there usually is some kind of identity determination followed by a SQL user with permission to query only the required functions and data sets.
On top of this, there should be output escaping to ensure that a attacker, who is able to manipulate the output for users, is limited in the harm he is able to cause.

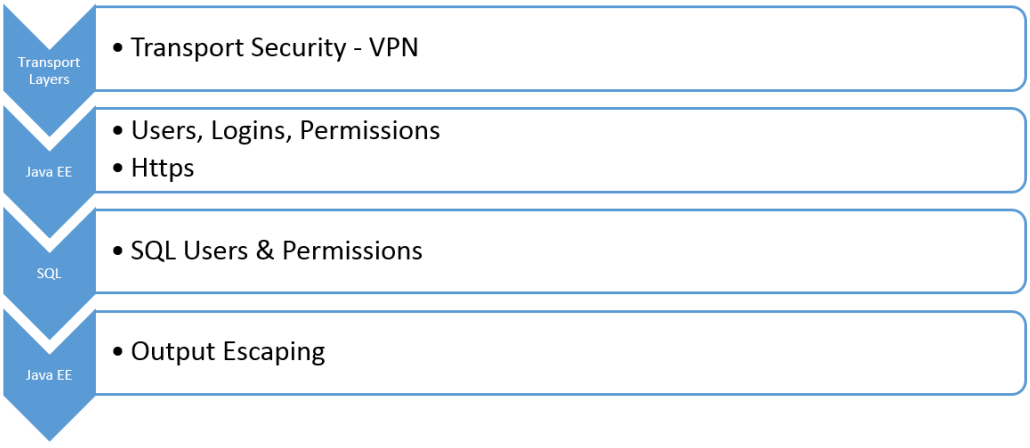

Figure 1.1: Security Layers in a common JEE application

According to Oracle[4], there are two ways to implement such access control functionality with Java EE:

1. Programmatic
2. Declarative (this includes Annotations and XML-Files)

While the programmatic implementation offers a wider range of customization, the declarative provides a well structured and easy to use approach.

1.2 Authentication

Authentication describes the identification process. This is mostly done by asking for a user-name & password or sending a Token/Hash.

1.3 Authorization

Authorization is what happens after you are authenticated.
It deals with the question of what a authenticated person is allowed to do.
Authorization may be applied to URLs or resources like Beans and Servlets.

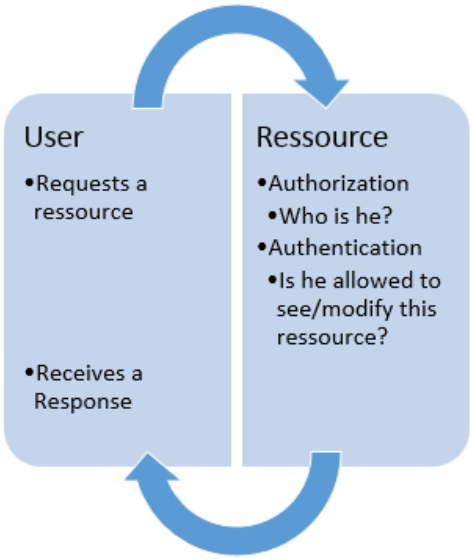

Figure 1.2: Authentication & Authorization

1.4 Deployment Descriptors

A Deployment Descriptor describes how a Java EE application should be deployed.
They contain information about security constraints, accessibility and resource references.

Deployment Descriptors are XML-Files that are by default located in the /WEB-INF/ directory.
The following deployment descriptors may be found there:

- web.xml
- <vendor-specific>.xml (E.g. when using Glassfish: glassfish-web.xml)

web.xml

Protected Resources
Security Roles
Authentication methods

(vendor-specific).xml

User – Role mapping
Group – Role mapping

Vendor specific settings

1.5 Principals

A Principal is a identity that can be authenticated.
E.g. a Unique user name

1.6 Credential

A Credential is defined as information that is used to authenticate a Principal.
E.g. a Password

1.7 Groups

Groups and Principals can be mapped to Roles.
Groups are defined in vendor-specific.xml

1.8 Roles

Permissions are granted to Roles.
Roles are defined in the web.xml file

1.9 Realms

aka Security policy domain
Provides information about principals, their Groups and their credentials
May be a Database, File structure, connection...

In other words:
It contains user information
E.g. Username, Password & Permissions

1.10 Implementation sample

https://github.com/aayvazyan-tgm/JavaEESecurityExample

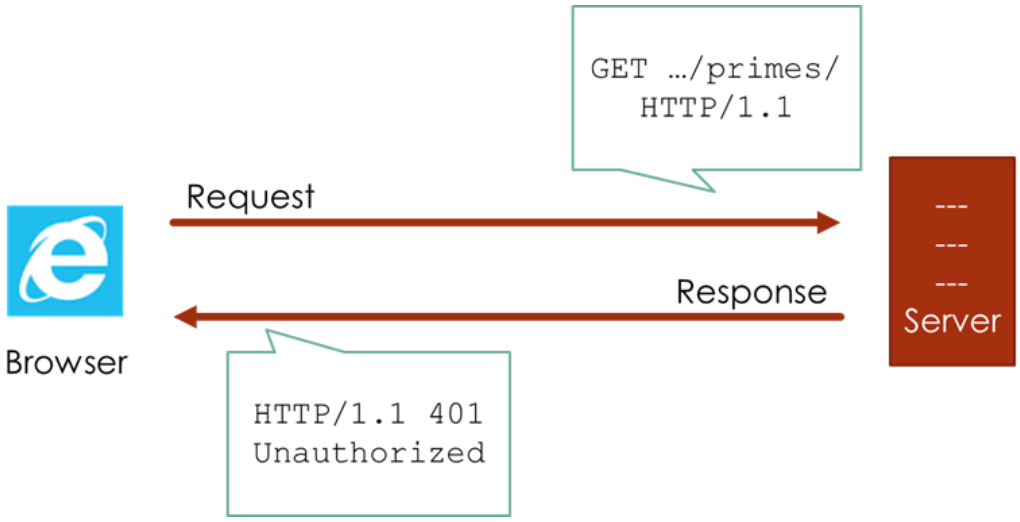

Figure 1.3: The user tries to access a resource without authentication

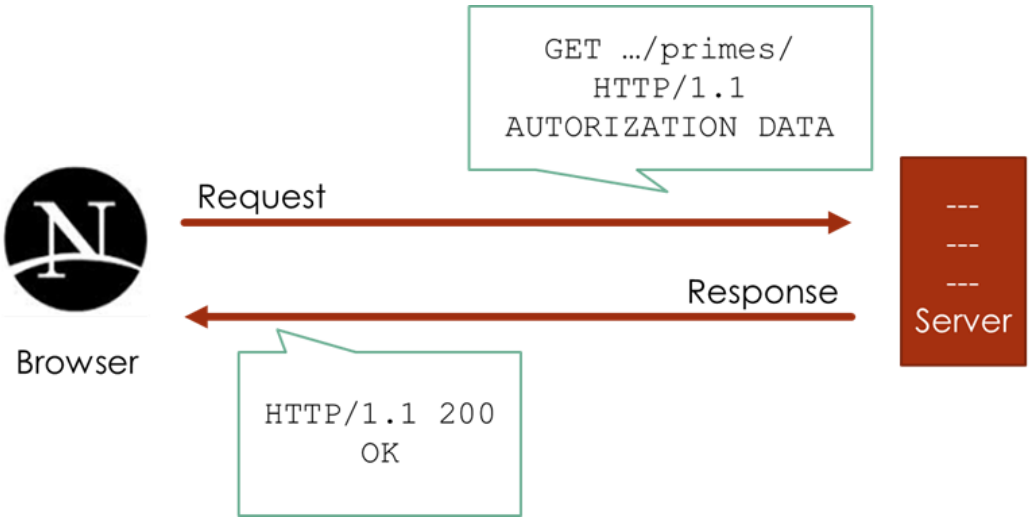

Figure 1.4: The user sends authentication data with his request

1.11 Frameworks

1.11.1 Shiro

Offers: Authentication, Authorization, Cryptography
Simple to use

Advantages/Disadvantages
Implementation Sample

1.11.2 Spring

Offers: Authentication, Authorization, Cryptography
Very structured

Advantages/Disadvantages

1.11.3 JAAS - Java Authentication and Authorization Service

Offers: Authentication, Authorization, Cryptography
Included in Java SE since Java 1.4 (javax.security.auth)

Advantages/Disadvantages

1.12 Output escaping

Escape user input to prevent injections.

Escape the output to add a extra layer of security.
Use a Framework to do so!

1.13 Whats to come in Part 2 (Adrian)

- Working with Digital Certificates

- Securing Application Clients
- Security with Enterprise Beans
- Further Framework Information

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