AOWP: Web-specific AOP framework for PHP

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Motivation

- There are several crosscutting-concerns (CCCs) in Web applications.
- Aspect-oriented programming (AOP) is a technique to modularize CCCs.
- However, it is not easy to apply general-purpose AO languages (GPALs) because GPALs cannot handle directly Web-specific concepts such as HTTP request transaction and user sessions.

**e.g. Access control**
The concern affects specified page request transactions based on whether each user is authenticated or not.

AOWP

In addition to the mechanism of GPALs, AOWP provides following Web-specific AOP mechanisms;

- **request join point** which represents page request transactions, and **pointcut designators** based on Web-specific concept
- **aspect instantiation mechanism** based on **user session**.

Web-specific pointcut designators

<table>
<thead>
<tr>
<th>Designator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>request</td>
<td>Select request joinpoints</td>
</tr>
<tr>
<td>pflow</td>
<td>Handle flows of page requests</td>
</tr>
<tr>
<td>cookieget</td>
<td>Select events of reading cookie data</td>
</tr>
<tr>
<td>cookieset</td>
<td>Select events of writing cookie data</td>
</tr>
</tbody>
</table>

Tool overview

We implement the weaver as a command-line-based PHP program

Examples

The target system of weaving: PukiWiki (http://pukiwiki.sourceforge.jp/)

- **AuthAspect (per-session instance)**
  - **User Authentication**
  - **Instance variable** $$_authedUser
  - **Pointcut** request("")
  - **Description** Record the result of the authentication

- **MonitorAspect (per-application instance)**
  - **Instance variable** $$_accessCount
  - **Pointcut** request(“, array(cmd => read | edit)) or request(“, array(plugin => newpage))
  - **Description** Stop the service for managing the contents when the number of access users is too many

- **QuestionnaireAspect (per-session instance)**
  - **Instance variable** $$_accessTime
  - **Pointcut** request("")
  - **Description** Show the questionnaire after 1 minute from the first user access