Java EE

Cours de 2e année ingénieur
Spécialisation « Génie Informatique »

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Présentation du cours

- Pôle GL-I2 « Génie logiciel avancé »
  - 20h sur 8 semaines
- Objectifs
  - Initiation aux frameworks Java EE
    - MVC : Struts
    - Persistance : Hibernate
  - Etude et apprentissage de nouveaux frameworks
- Prérequis
  - Java SE, Java EE (Servlet, JSP, EL/JSTL, MVC), XML, SQL

Frameworks MVC

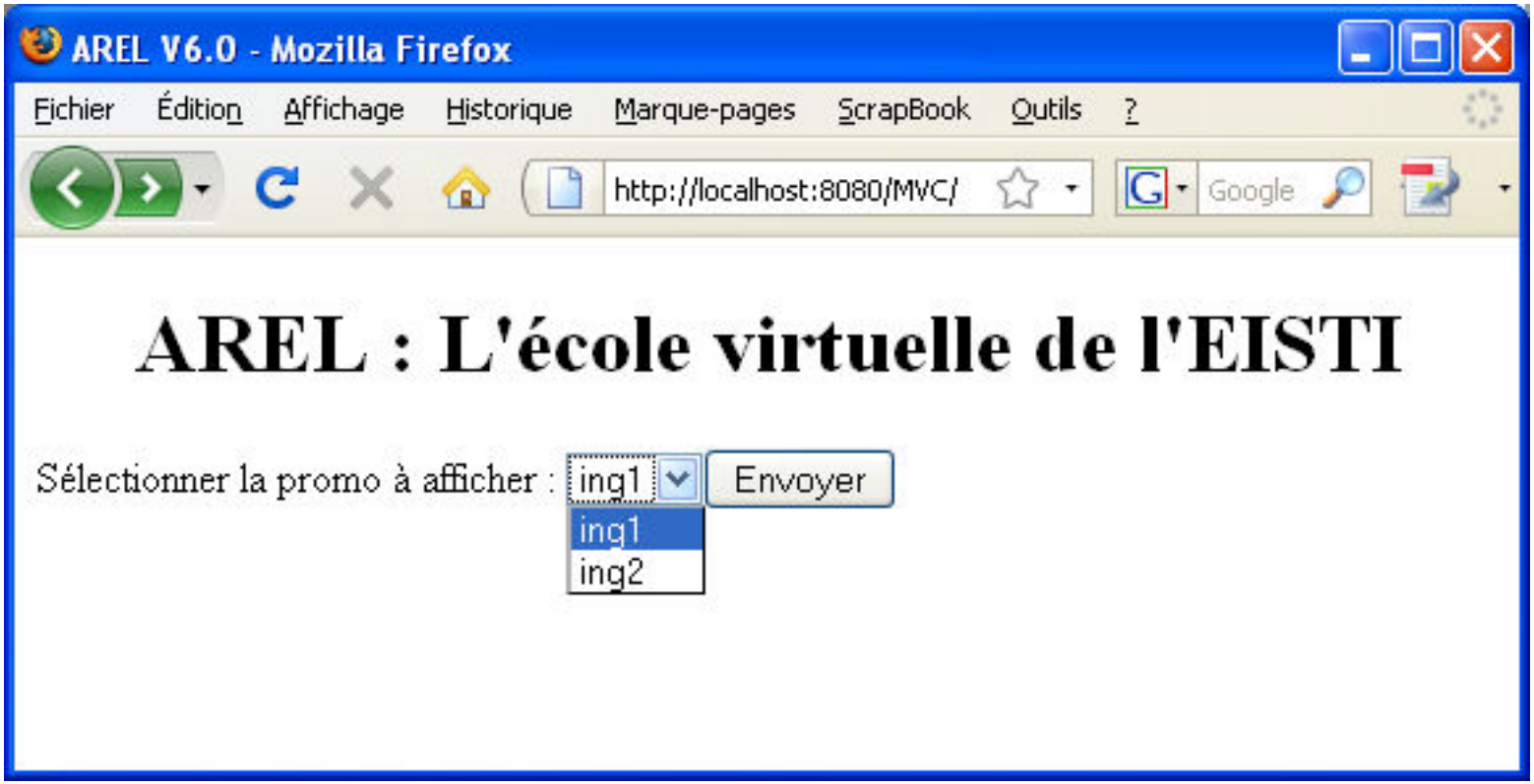
- Struts 2 (http://struts.apache.org/2.x/)
- Stripes (http://www.stripesframework.org)
- JavaServer Faces (http://jcp.org/en/jsr/detail?id=127)
- Tapestry (http://tapestry.apache.org/)
- Wicket (http://wicket.apache.org/)
- Makumba (http://www.makumba.org/)
- Maverick (http://mav.sourceforge.net/)
- Calyxo (http://calyxo.org/index.html)

Frameworks persistance / XML

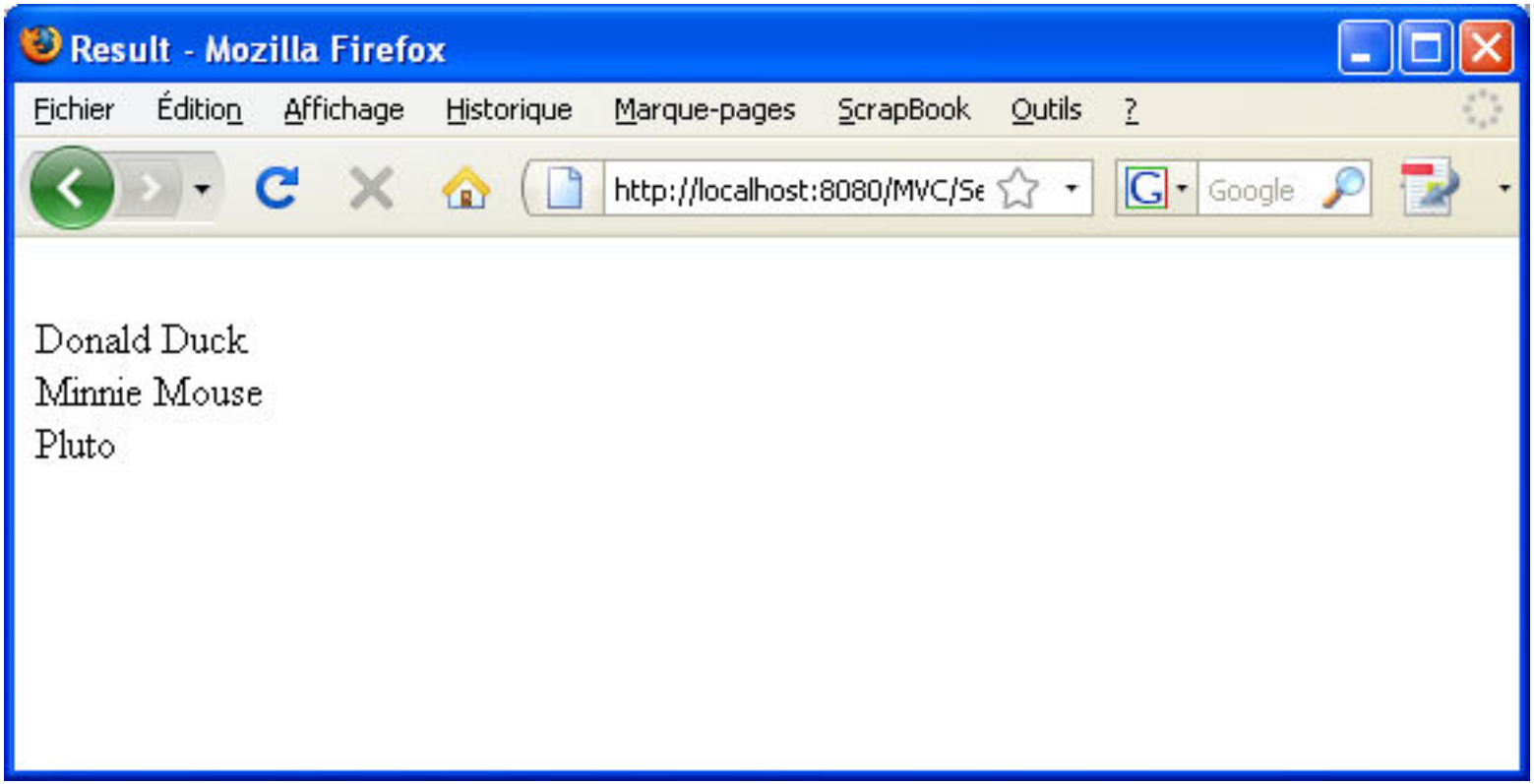
- xstream (http://xstream.codehaus.org/)
- xmlbeans (http://xmlbeans.apache.org/)
- castor (http://www.castor.org)
- JAXB (https://jaxb.dev.java.net/)
- JiBX (http://jibx.sourceforge.net/)
- EclipseLink (http://www.eclipse.org/eclipselink/)
- CookXml (http://cookxml.yuanheng.org/)

Rappel MVC

Ex : AREL V6 - liste des promos

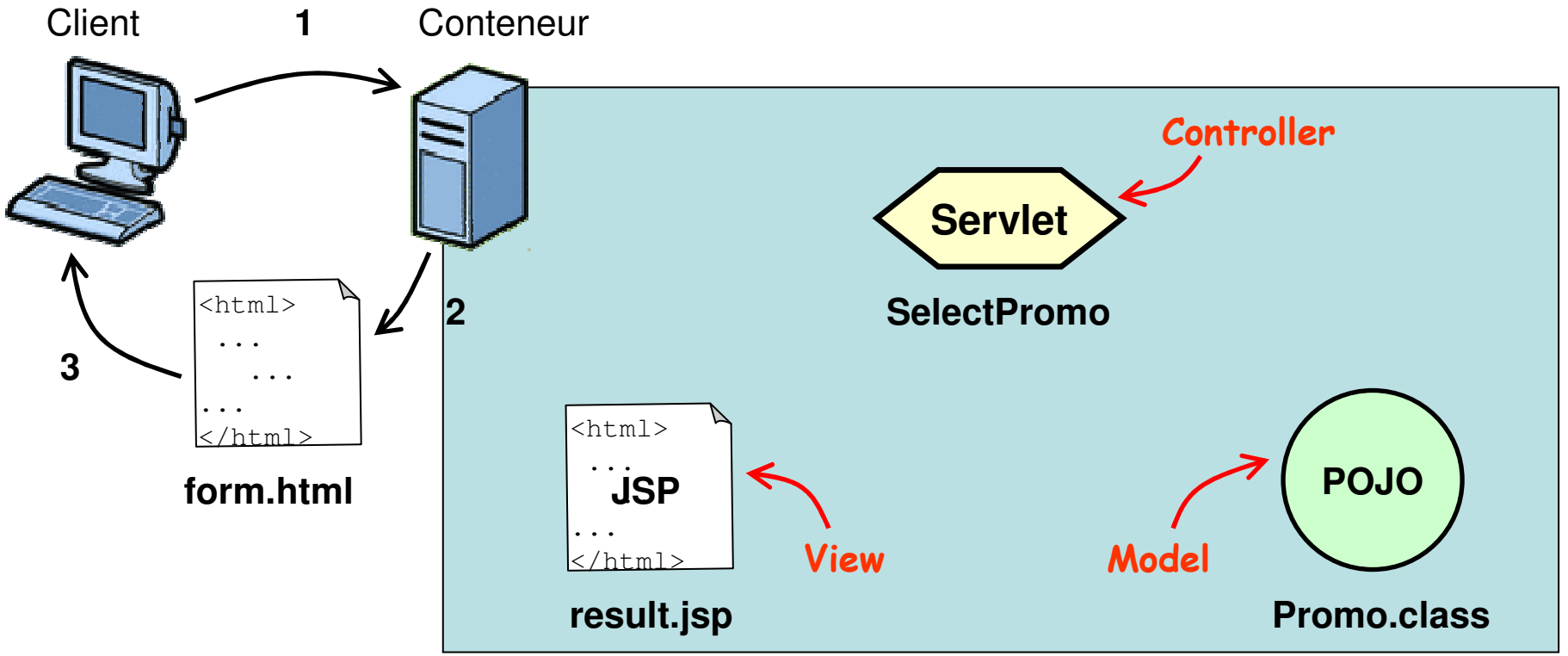


Ex : AREL V6 - liste des promos



MVC : étape 1

Le client récupère un formulaire (form.html)
pour passer une requête avec paramètres (1, 2, puis 3)

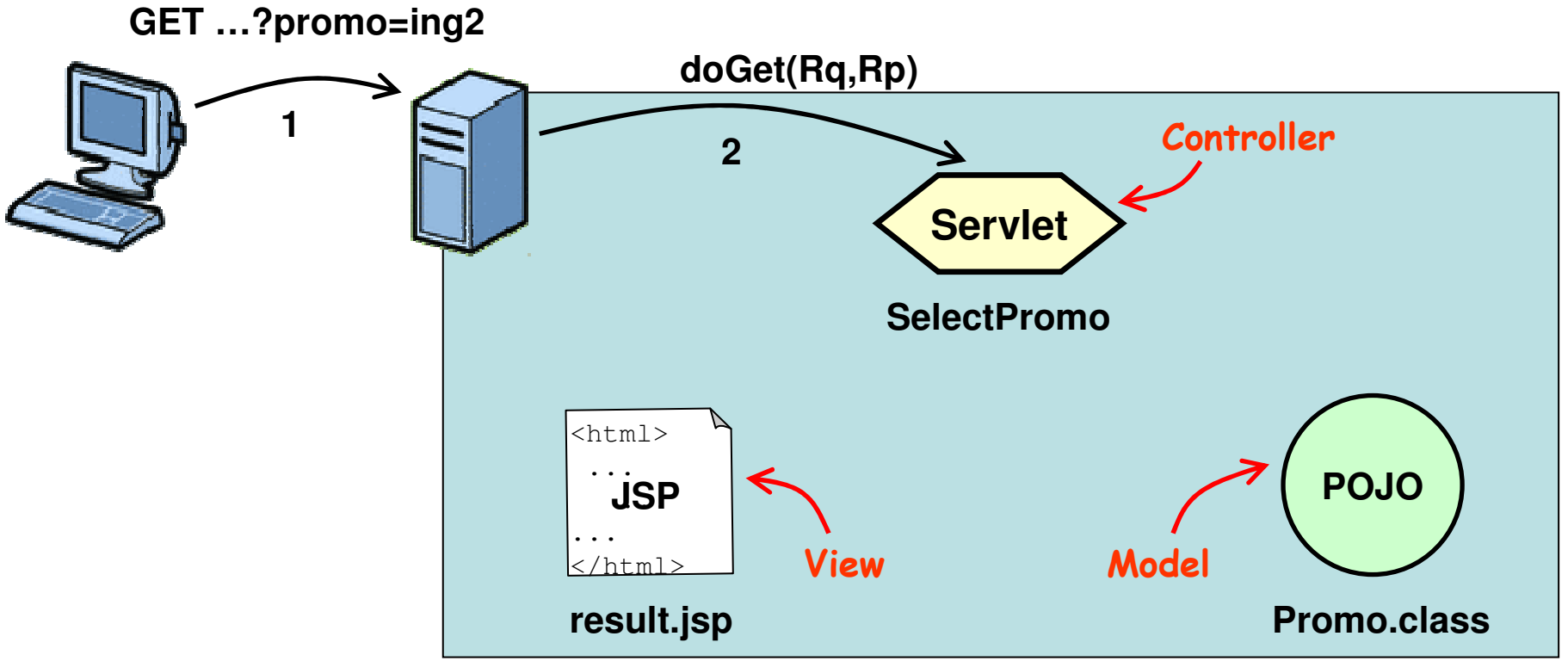


Formulaire : form.html

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
 "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type"
      content="text/html; charset=ISO-8859-1">
<title>AREL V6.0</title>
</head>
<body>
  <h1 align="center">AREL : L'école virtuelle de l'EISTI</h1>

<form method="GET" action="http://localhost:8080/MVC/SelectPromo">
Sélectionner la promo à afficher :

 <select name="promo" size="1">
  <option>ing1</option>
  <option>ing2</option>
 </select><input type="SUBMIT" />

</form>

</body>
</html>
```

MVC : étape 2

1. Le client envoie son formulaire (GET/POST avec paramètres)
2. Le conteneur transmet au servlet correspondant (le *controller*)



Controller : SelectPromo.java

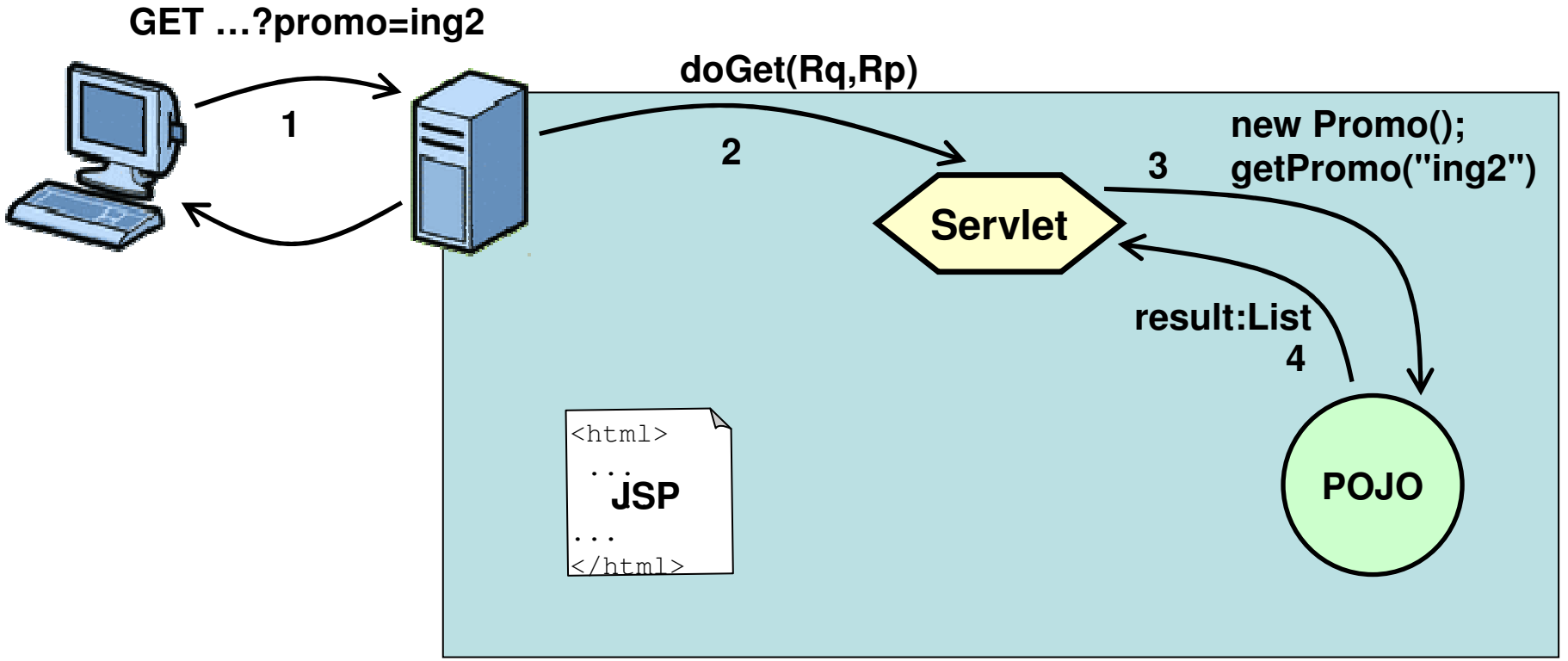
```
package arel;

import ...;

public class SelectPromo extends javax.servlet.http.HttpServlet
                         implements javax.servlet.Servlet {
  //...
  protected void doGet(HttpServletRequest request,
                       HttpServletResponse response)
                throws ServletException, IOException {

    String  promoName = request.getParameter("promo");

    //...
  }
}
```

Configuration : web.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<web-app xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xmlns="http://java.sun.com/xml/ns/javaee"
         xmlns:web="http://java.sun.com/xml/ns/javaee/web-app_2_5.xsd"
         xsi:schemaLocation="http://java.sun.com/xml/ns/javaee
 http://java.sun.com/xml/ns/javaee/web-app_2_5.xsd"
         id="WebApp_ID" version="2.5">
  <display-name>MVC</display-name>
  <welcome-file-list>
    <welcome-file>index.html</welcome-file>
</welcome-file-list>
  <servlet>
    <description></description>
    <display-name>SelectPromo</display-name>
    <servlet-name>SelectPromo</servlet-name>
    <servlet-class>arel.SelectPromo</servlet-class>
  </servlet>
  <servlet-mapping>
    <servlet-name>SelectPromo</servlet-name>
    <url-pattern>/SelectPromo</url-pattern>
  </servlet-mapping>
</web-app>
```

MVC : étape 3

3. Le servlet *controller* interroge le *model* sur « ing2 »
4. Le *model* retourne au *controller* le résultat correspondant

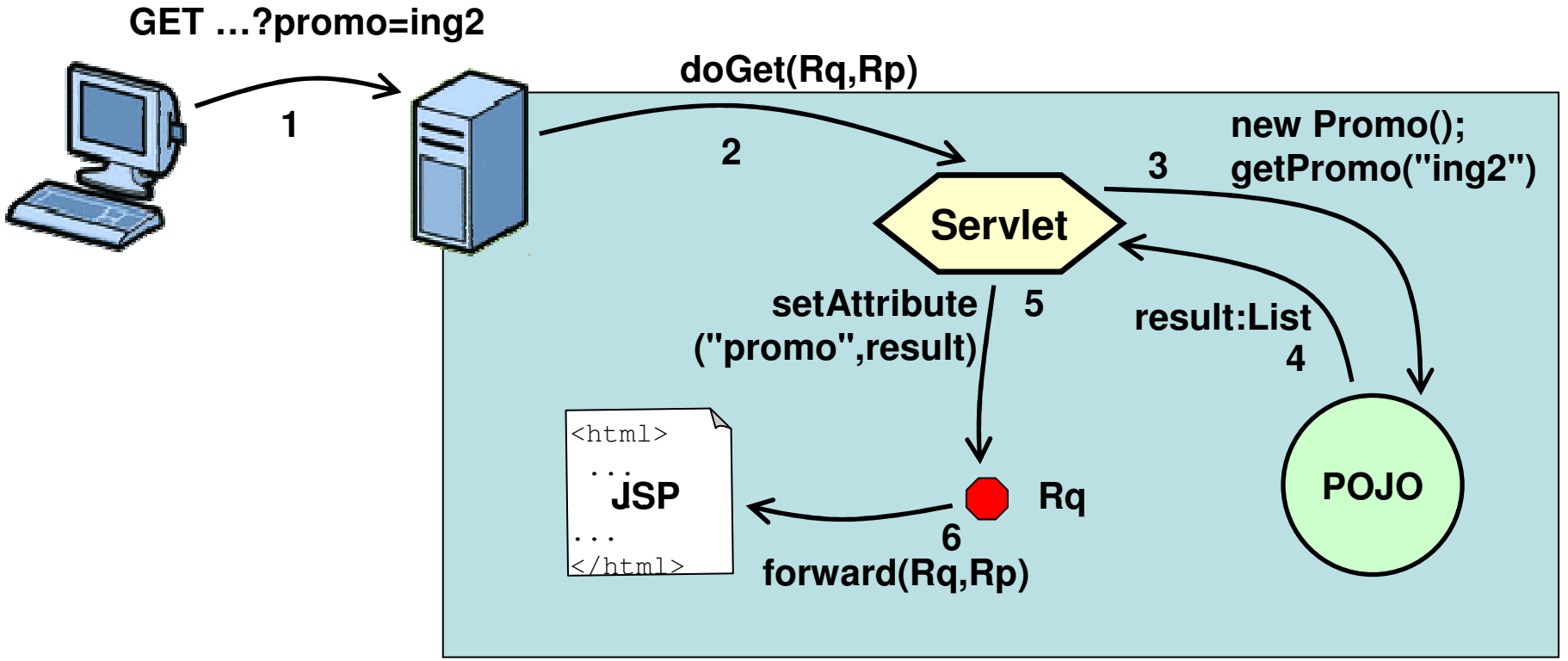


Model : Promo.java

```
package arel;
import ...;

public class Promo {

  public List<String> getPromo(String promo) {
    List<String> promoList = new ArrayList<String>();
    if (promo.equals("ing1")) {
      promoList.add("Donald Duck");
      promoList.add("Minnie Mouse");
      promoList.add("Pluto");  //...
    } else if (promo.equals("ing2")) {
      promoList.add("Mickey Mouse");
      promoList.add("Daisy Duck");
      promoList.add("Goofy");  //...
    } else { return null; }

    return promoList;
  }
}
```

MVC : étape 4

5. Le *controller* utilise les données du *model* pour sa réponse
6. Le *controller* transmet sa réponse à la *view* (JSP)

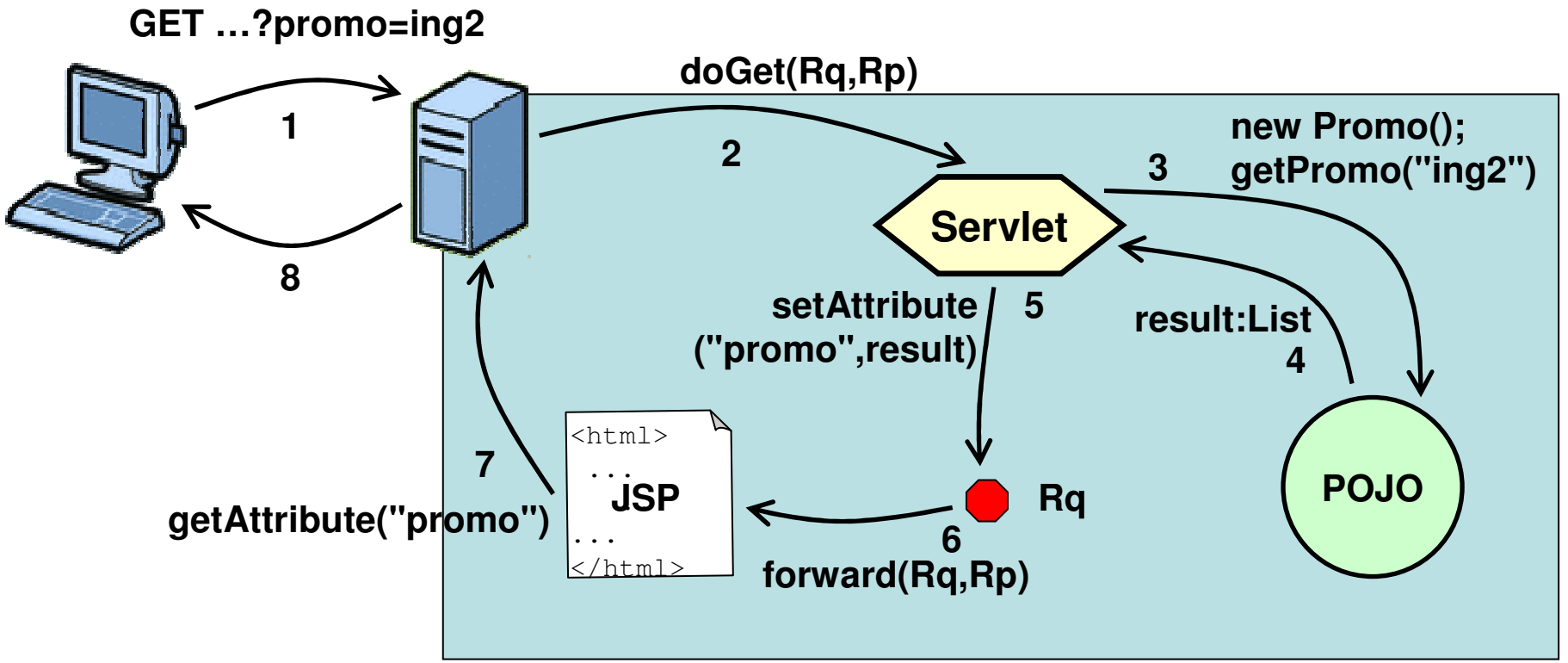


Controller : SelectPromo.java

```
package arel;

import ...;

public class SelectPromo extends javax.servlet.http.HttpServlet
                         implements javax.servlet.Servlet {
  //...
  protected void doGet(HttpServletRequest request,
                       HttpServletResponse response)
                throws ServletException, IOException {
    String  promoName = request.getParameter("promo");
    Promo promo = new Promo();
    List<String> result = promo.getPromo(promoName);
    request.setAttribute("promo", result);
    RequestDispatcher view =
      request.getRequestDispatcher("result.jsp");
    view.forward(request, response);
  }
}
```

MVC : étape 5

7. La JSP (view) traite la réponse transmise par le *controller*
8. La page HTML résultante est reçue par le client



View : result.jsp

```
<%@ page import="java.util.*" %>
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
 "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type«
      content="text/html; charset=ISO-8859-1">
<title>Result</title>
</head>
<body>
<%
  List<String> promoList = (List<String>)request.getAttribute("promo");
  Iterator it = promoList.iterator();
  while(it.hasNext()) {
    out.print("<br />" + it.next());
  }
%>
</body>
</html>
```

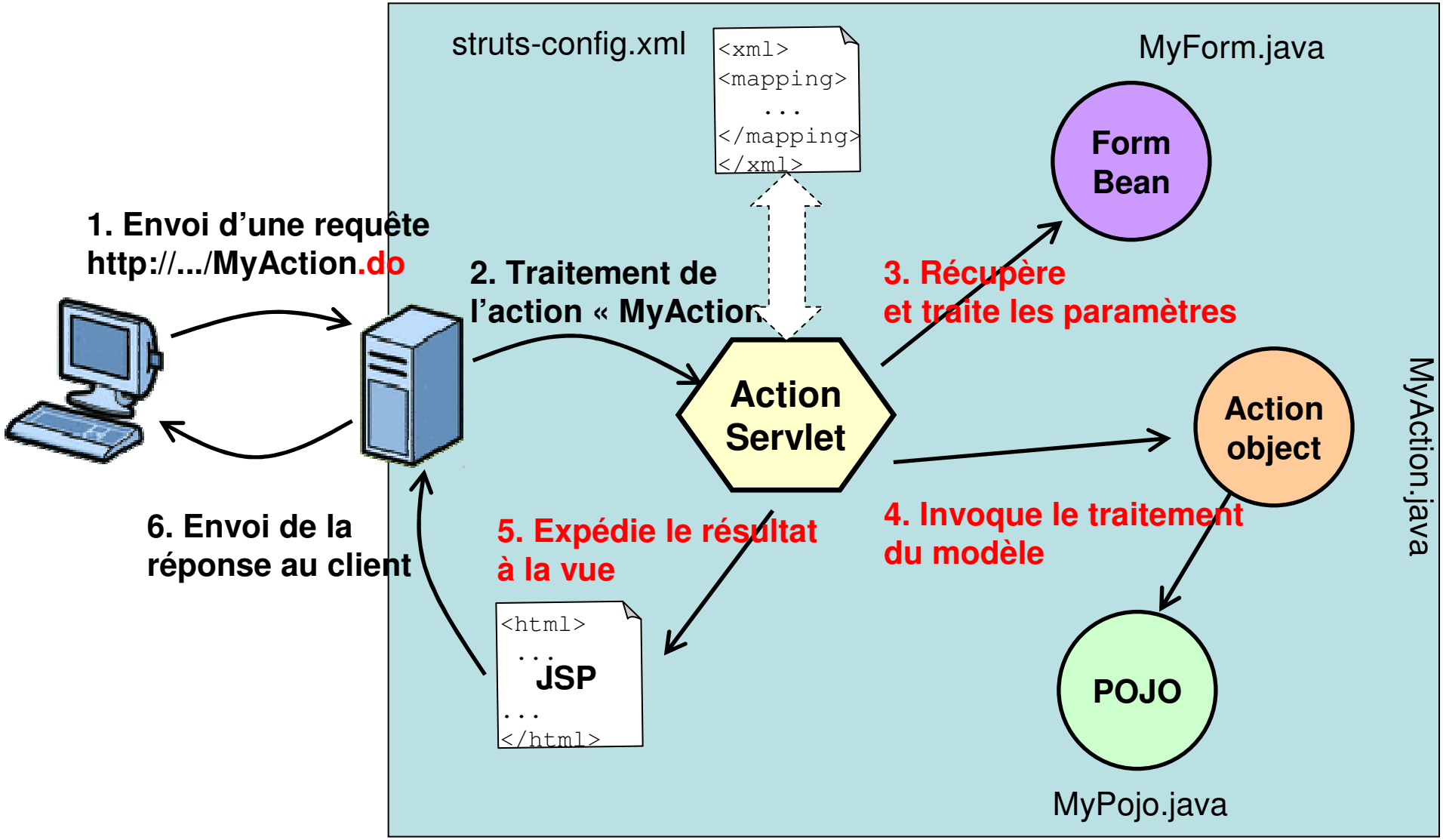
Struts

http://struts.apache.org/1.3.10/index.html

Une composition de patterns

- Mise en œuvre d'un design pattern pour Java EE : « Front Controller »
  - Un seul servlet pour traiter toutes les requêtes
  - Cf. http://java.sun.com/blueprints/patterns/catalog.html
- Le Front Controller, appelé ActionServlet, permet de mettre en œuvre le pattern MVC de façon générique

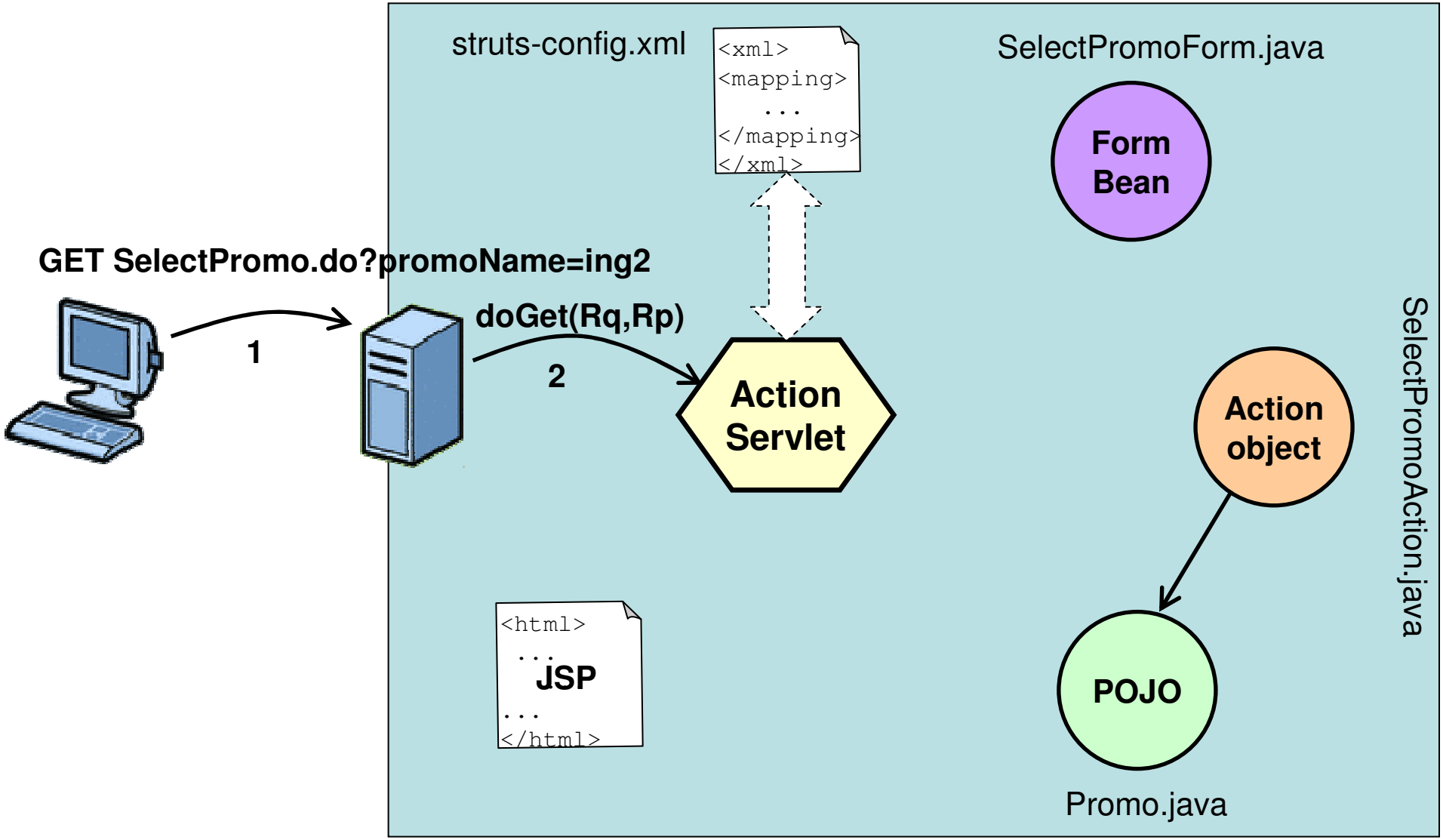
Architecture Struts



Configuration : web.xml

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!DOCTYPE web-app PUBLIC … >

<web-app>
  <display-name>Struts Blank Application</display-name>

  <!-- Standard Action Servlet Configuration -->
  <servlet>
    <servlet-name>action</servlet-name>
    <servlet-class>org.apache.struts.action.ActionServlet
    </servlet-class>
    <init-param>
      <param-name>config</param-name>
      <param-value>/WEB-INF/struts-config.xml</param-value>
    </init-param>
    <load-on-startup>1</load-on-startup>
 </servlet>

  <!-- Standard Action Servlet Mapping -->
  <servlet-mapping>
    <servlet-name>action</servlet-name>
    <url-pattern>*.do</url-pattern>
  </servlet-mapping>
</web-app>
```

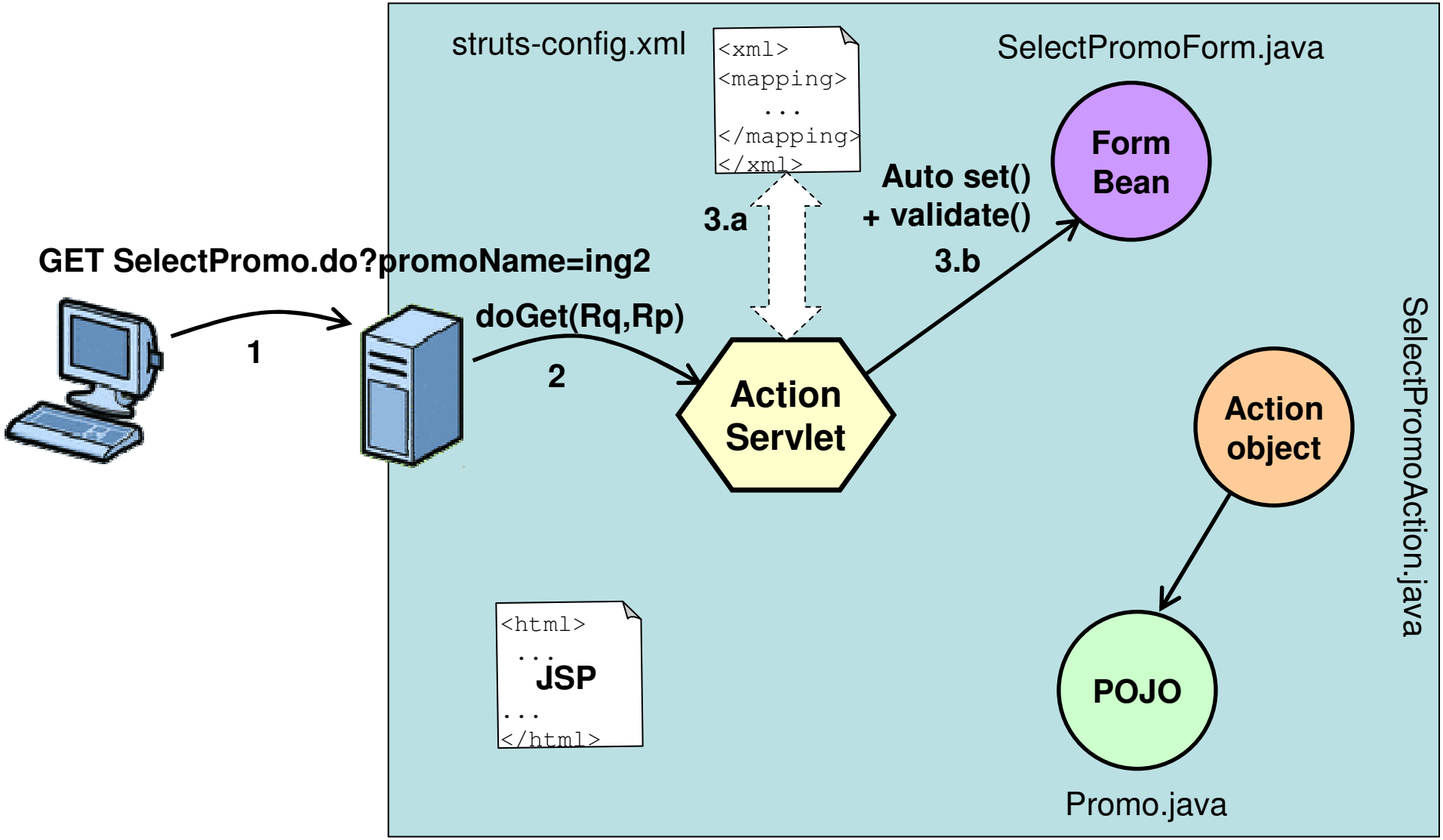
Étapes 1 & 2


struts-config.xml
<xml>
<mapping>
...
</mapping>
</xml>
SelectPromoForm.java
Form Bean
GET SelectPromo.do?promoName=ing2
1
doGet(Rq,Rp)
2
Action Servlet
Action object
SelectPromoAction.java
<html>
...
JSP
...
</html>
POJO
Promo.java

Configuration : struts-config.xml

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<!DOCTYPE struts-config PUBLIC … struts-config_1_3.dtd">

<struts-config>
<!-- Form Bean Definitions -->
 <form-beans>
   <form-bean
    name="selectPromoForm"
    type="arel.SelectPromoForm" />
 </form-beans>

<!-- Action Mapping Definitions -->
 <action-mappings>
   <action path="/SelectPromo"
    type="arel.SelectPromoAction" name="selectPromoForm"
    scope="request" validate="true" input="/form.jsp">
     <forward name="show_results" path="/pages/result.jsp" />
   </action>
 </action-mappings>

<!-- Other Definitions… -->
</struts-config>
```

Étape 3


struts-config.xml
<xml>
<mapping>
...
</mapping>
</xml>
SelectPromoForm.java
Form Bean
Auto set()
+ validate()
3.b
3.a
GET SelectPromo.do?promoName=ing2
1
doGet(Rq,Rp)
2
Action Servlet
Action object
SelectPromoAction.java
<html>
...
JSP
...
</html>
POJO
Promo.java

Form bean : SelectPromoForm.java

```
package arel; import ...;

public class SelectPromoForm extends ActionForm {

  private String promoName;
  public void setPromoName(String pN) {promoName = pN;}
  public String getPromoName() {return promoName;}

  private static final String VALID_PROMOS = "ing1,ing2";

  public ActionErrors validate(ActionMapping mapping,
                               HttpServletRequest request) {
    ActionErrors errors = new ActionErrors();
    if(VALID_PROMOS.indexOf(promoName) == -1) {
      errors.add("promo",
              new ActionMessage("error.promoField.notValid"));
    }
    return errors;
  }
}
```

MessageResources.properties

```
# -- standard errors --
errors.header=<UL>
errors.prefix=<LI><B><FONT COLOR="RED">
errors.suffix=</FONT></B></LI>
errors.footer=</UL>
# -- my errors --
error.promoField.notValid=Invalid promo entered.
```

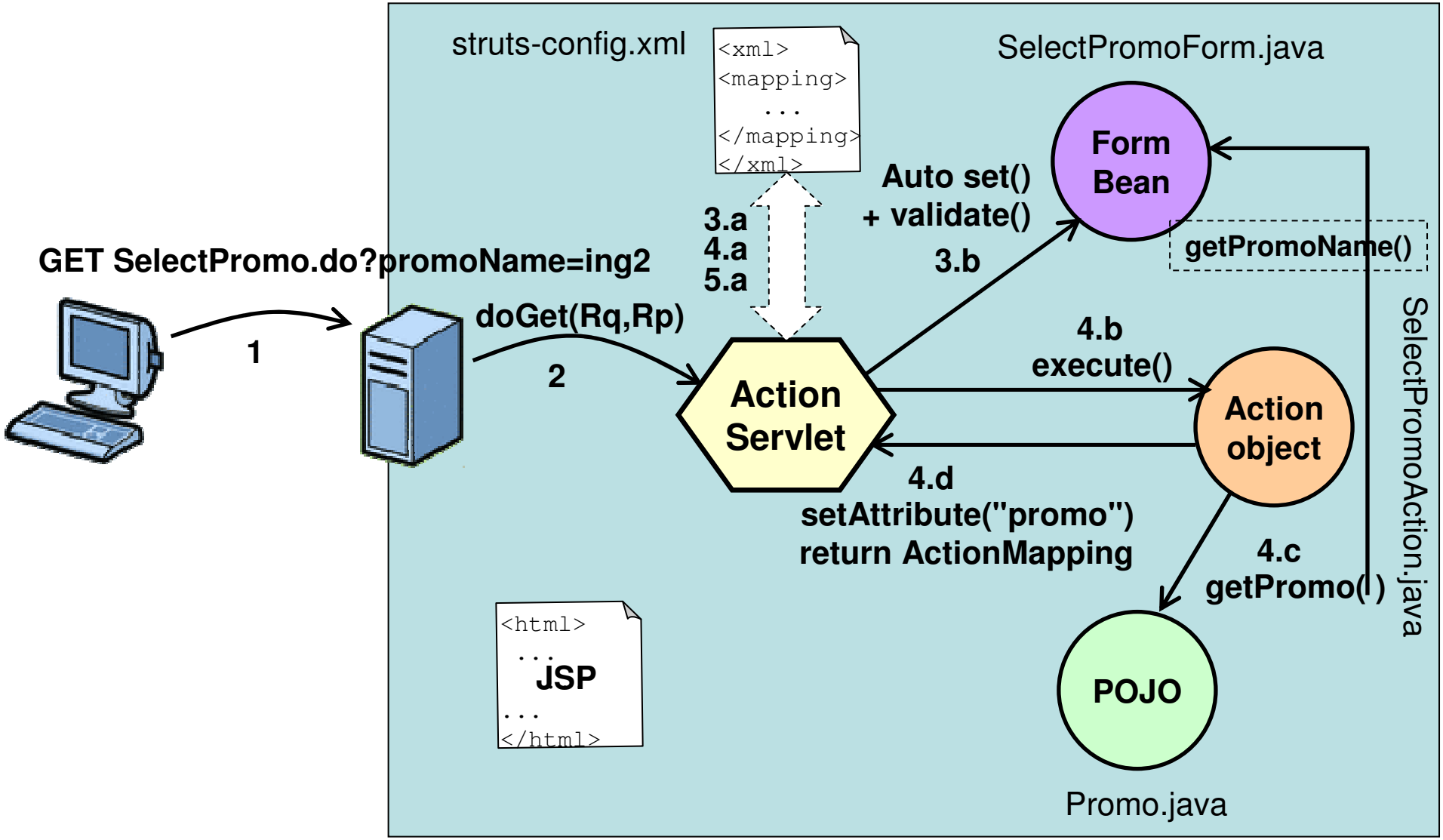
MessageResources_fr.properties

```
# -- standard errors --
errors.header=<UL>
errors.prefix=<LI><B><FONT COLOR="RED">
errors.suffix=</FONT></B></LI>
errors.footer=</UL>
# -- my errors --
error.promoField.notValid=La promo entrée est invalide.
```

Formulaire : form.jsp

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
    pageEncoding="ISO-8859-1"%>
<%@ taglib uri="http://struts.apache.org/tags-html" prefix="html" %>
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
                      "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1">
<title>AREL V6.0</title>
</head>
<body>
<h1 align="center">AREL : L'école virtuelle de l'EISTI</h1>

<html:errors/>

<form method="GET" action="SelectPromo.do">Sélectionner la promo à
afficher : <select name="promoName" size="1">
<option>ing1</option>
<option>ing2</option>
</select><input type="SUBMIT" /></form>
</body>
</html>
```

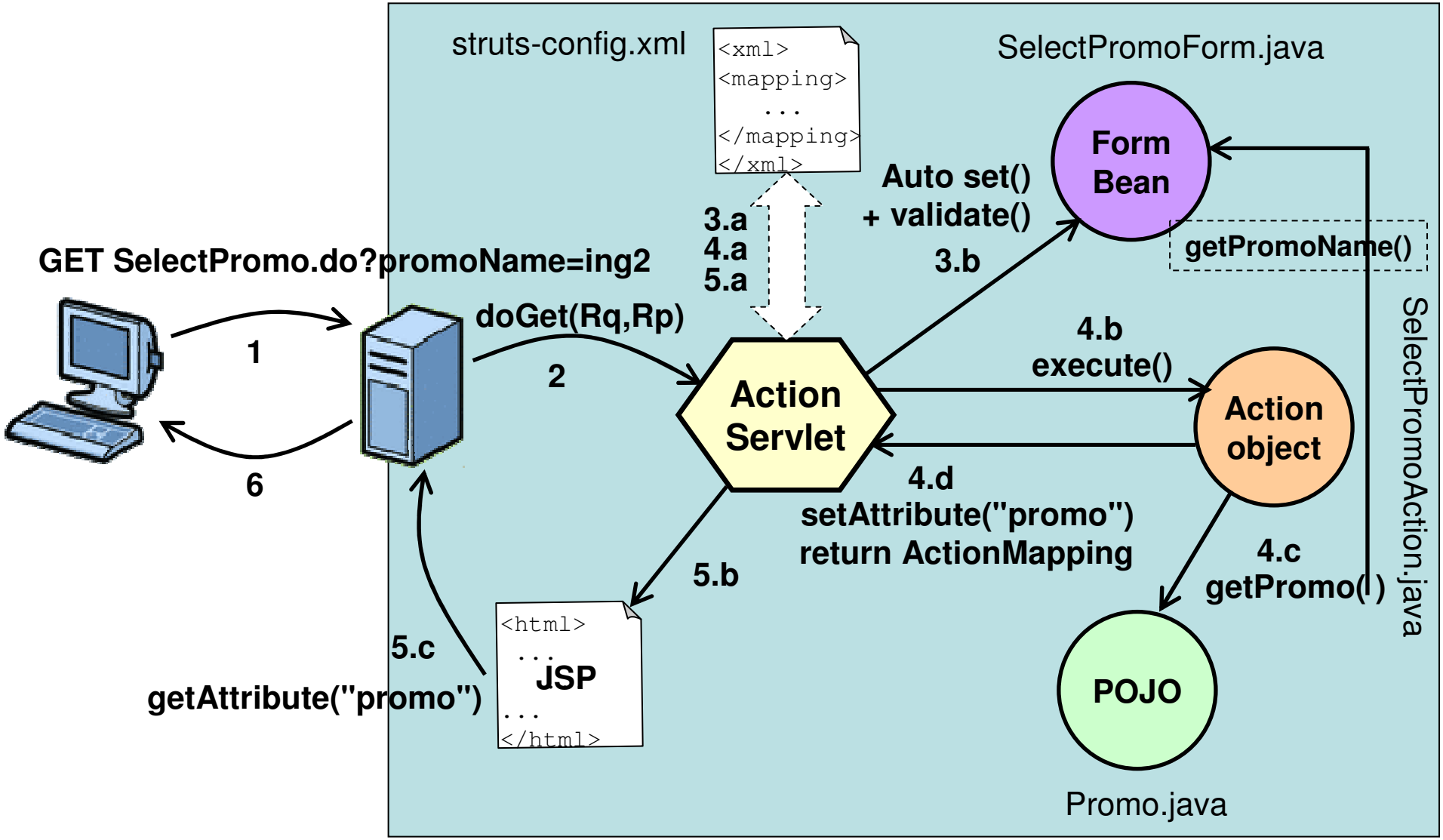
Étape 4


struts-config.xml
<xml>
<mapping>
...
</mapping>
</xml>
SelectPromoForm.java
Form Bean
getPromoName()
Auto set()
+ validate()
3.b
3.a
4.a
5.a
GET SelectPromo.do?promoName=ing2
1
doGet(Rq,Rp)
2
Action Servlet
4.b
execute()
Action object
4.d
setAttribute("promo")
return ActionMapping
4.c
getPromo()
SelectPromoAction.java
<html>
...
JSP
...
</html>
POJO
Promo.java

Action object : SelectPromoAction.java

```
package arel;
import ...;

public class SelectPromoAction extends Action {

 public ActionForward execute(ActionMapping mapping ,
                              ActionForm form,
                              HttpServletRequest request,
                              HttpServletResponse response) {

  SelectPromoForm myForm = (SelectPromoForm) form;

  Promo promo = new Promo();
  List<String> result = promo.getPromo(myForm.getPromoName());
  request.setAttribute("promo", result);

  return mapping.findForward("show_results");

 }

}
```

Étapes 5 & 6


struts-config.xml
<xml>
<mapping>
...
</mapping>
</xml>
SelectPromoForm.java
Form Bean
getPromoName()
SelectPromoAction.java
Auto set()
+ validate()
3.b
3.a
4.a
5.a
GET SelectPromo.do?promoName=ing2
1
doGet(Rq,Rp)
2
Action Servlet
4.b
execute()
Action object
4.d
setAttribute("promo")
return ActionMapping
4.c
getPromo()
5.b
6
5.c
getAttribute("promo")
<html>
...
JSP
...
</html>
POJO
Promo.java

TP struts

TP : install struts

- Download struts-1.3.10 sur struts.apache.org
- Eclipse : File/Import…
  - Web/WAR file
  - WAR file : struts-blank-1.3.10.war
  - Web project : my-struts-project
  - Finish!
- Exercices :
  - modifiez l'affichage du Welcome pour la locale _fr

TP : exemple du cours

- À partir d'un projet struts-blank, implémentez l'exemple du cours sur les promos

TP : exemples struts

- Importez struts-cookbook-1.3.10.war
- Exercice
  - À partir des 2 premiers exemples sur le Simple Form, adaptez l'exemple du cours pour utiliser un DynaActionForm (ActionForm déclaré dans le struts-config.xml)