pallas

Member of the ExperTeam Group

The UNICOREpro Client

Programming Client Plug-Ins

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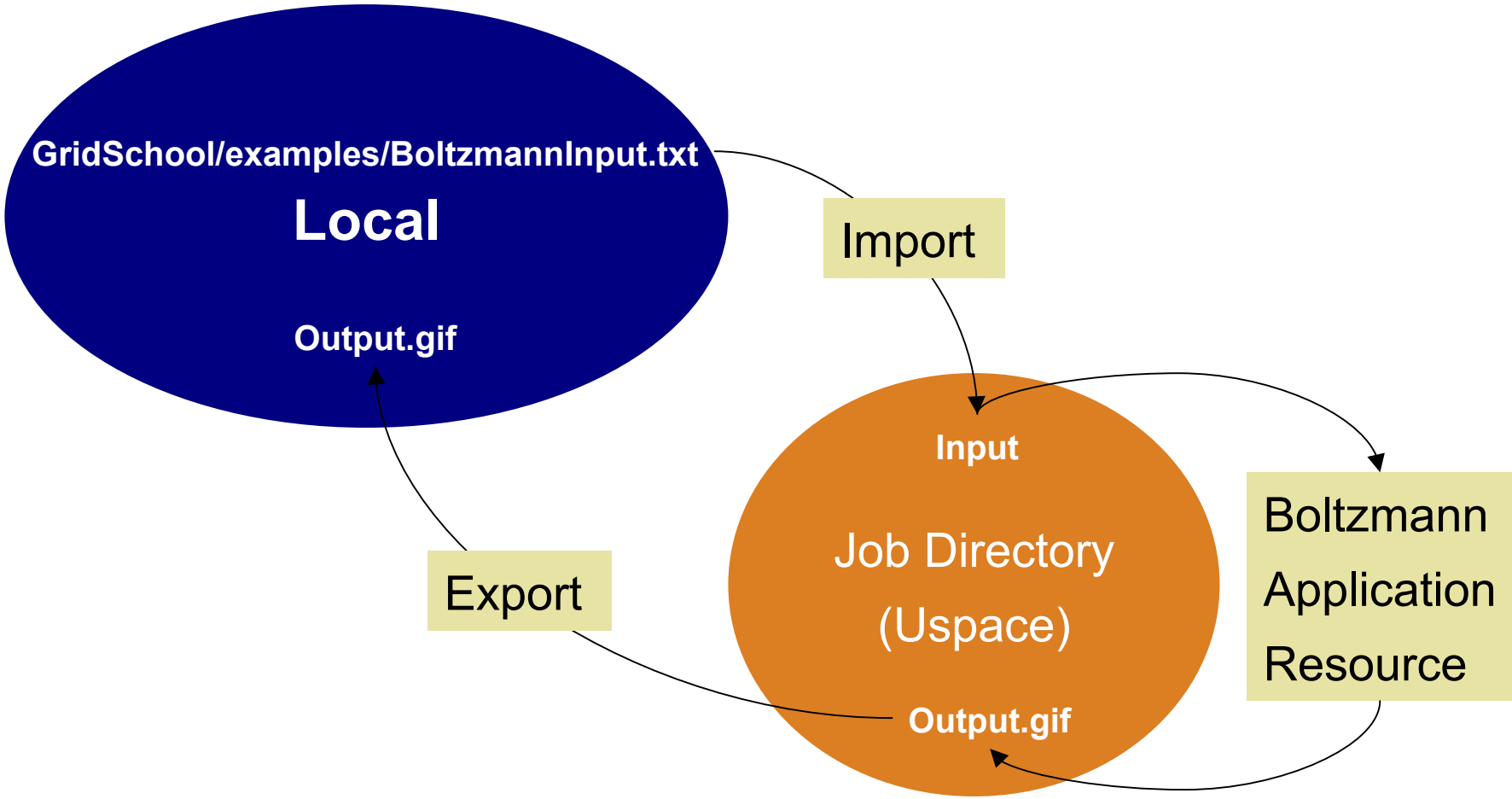
Starting Point: The Lattice Boltzmann Application

- Scenario: A site wants to make new application available on the Grid
- Example: Lattice Boltzmann
  - Simulation of fluent mixing
  - Output: a gif animation
  - Intermediate sample files are generated
  - A control file can change parameters while application is executing
- Integrate Boltzmann application into Client GUI with a Plugin!

Overview

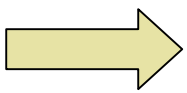
- **Step 1**
  - Use Command Task to run application
  - Specify input and output files in import/export panels
- **Step 2**
  - Write a specialized Boltzmann plugin task
- **Step 3**
  - Edit and automatically send the input file
  - Automatically set output file export
- **Step 4**
  - Get sample files while application is executing
  - Visualize sample files in outcome area

Step1: Executing a Command Task



Writing Task Plugins

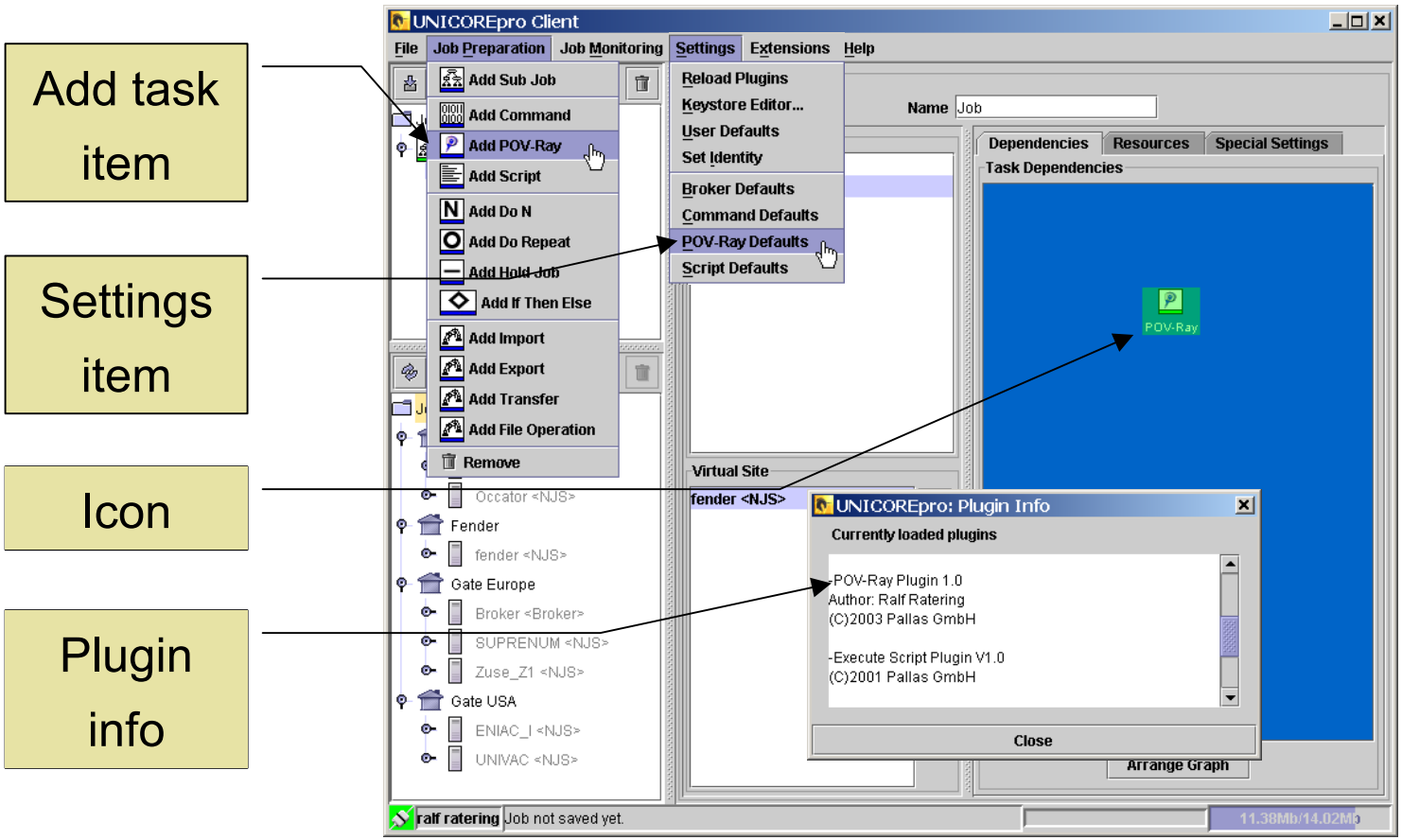
- Disadvantages of Command task
  - Input file has to be edited outside Client
  - Imports and Exports have to be specified manually
  - No integrated GUI for parameters
  - Results have to be visualized outside client
  - No additional functionality possible (sample and control files)



Write a specialized Boltzmann Plugin Task!

Task Plugins

- Add a new type of task to the Client GUI
- New task can be integrated into complex jobs
- Application support: CPMD, Fluent, Gaussian, etc.

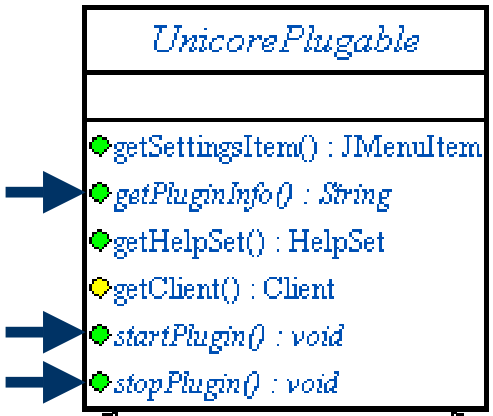


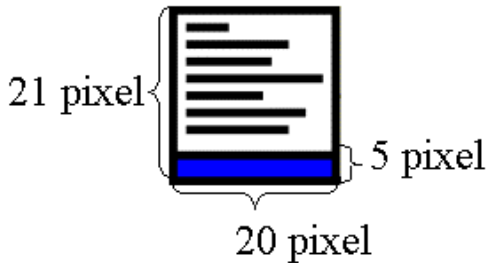
Writing a Task Plugin

- Implement 3 Classes
  - Main plugin class
  - Plugin Container
  - JPAPanel
- Build a Jar Archive named „*Plugin.jar“
- Sign the Jar with your Certificate

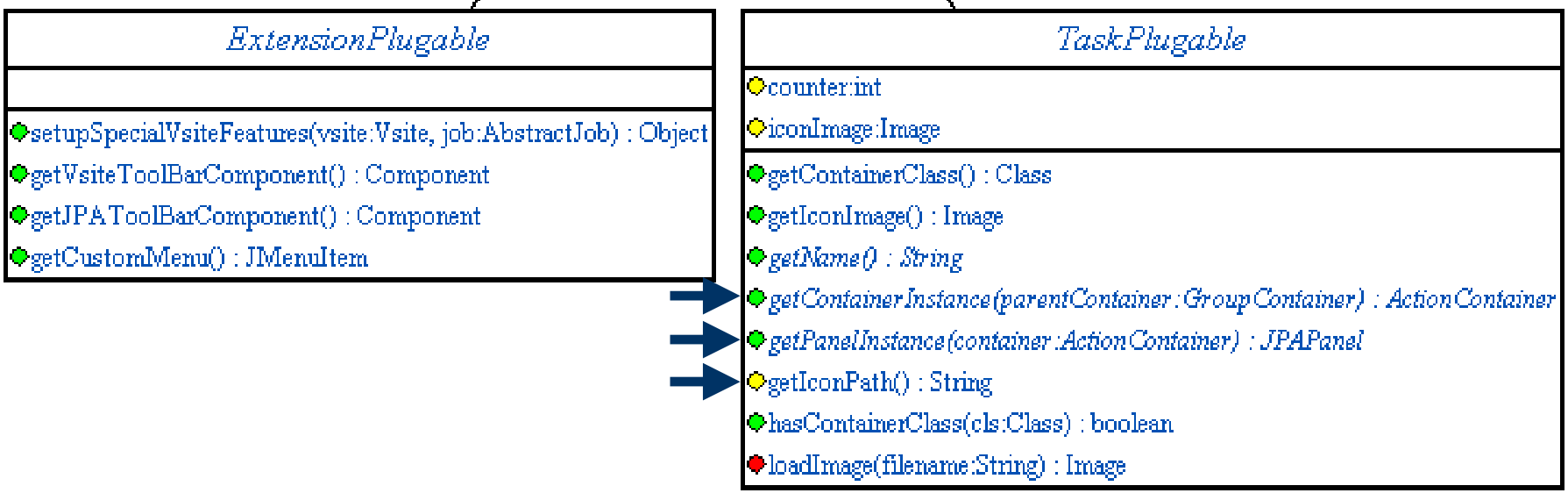
Main Plugin Class

- Start and stop plugin
- Manage plugin objects





Icon Format

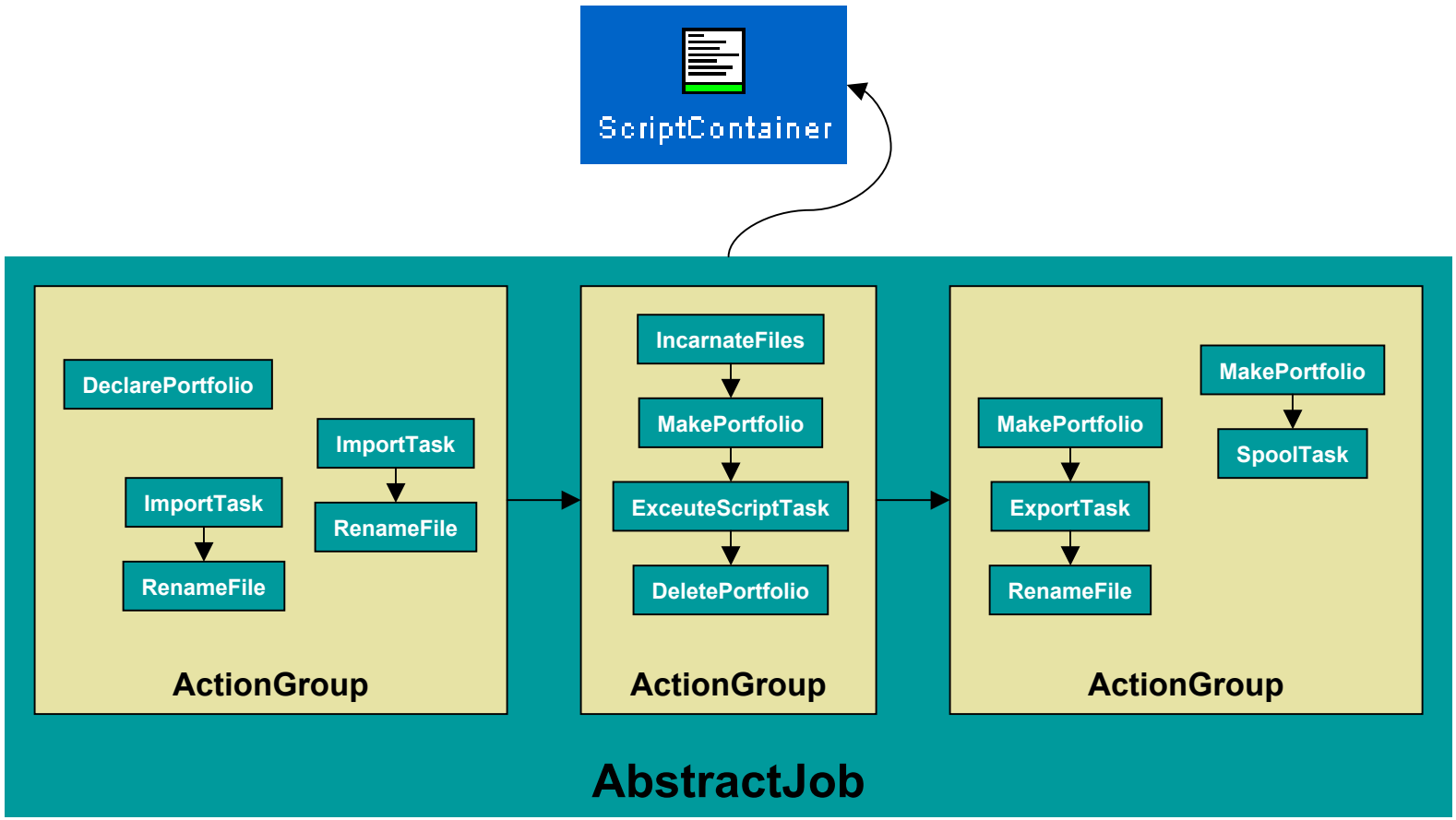


Plugin Container

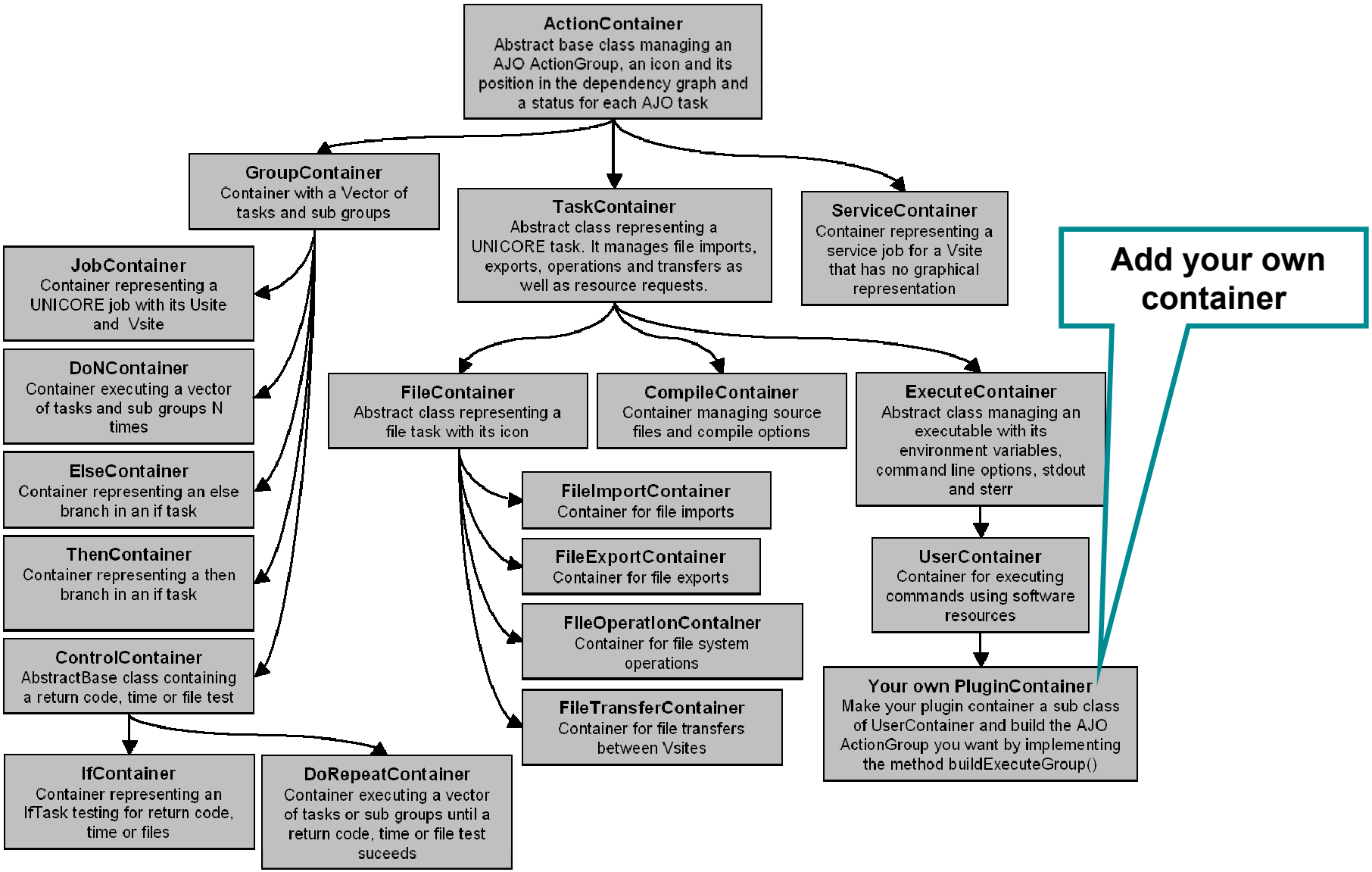
- Build **Abstract Job Object** (AJO)
- Manage imports, exports and execution
- Hold parameters
- Keep status
- Check errors

AJOs and Containers

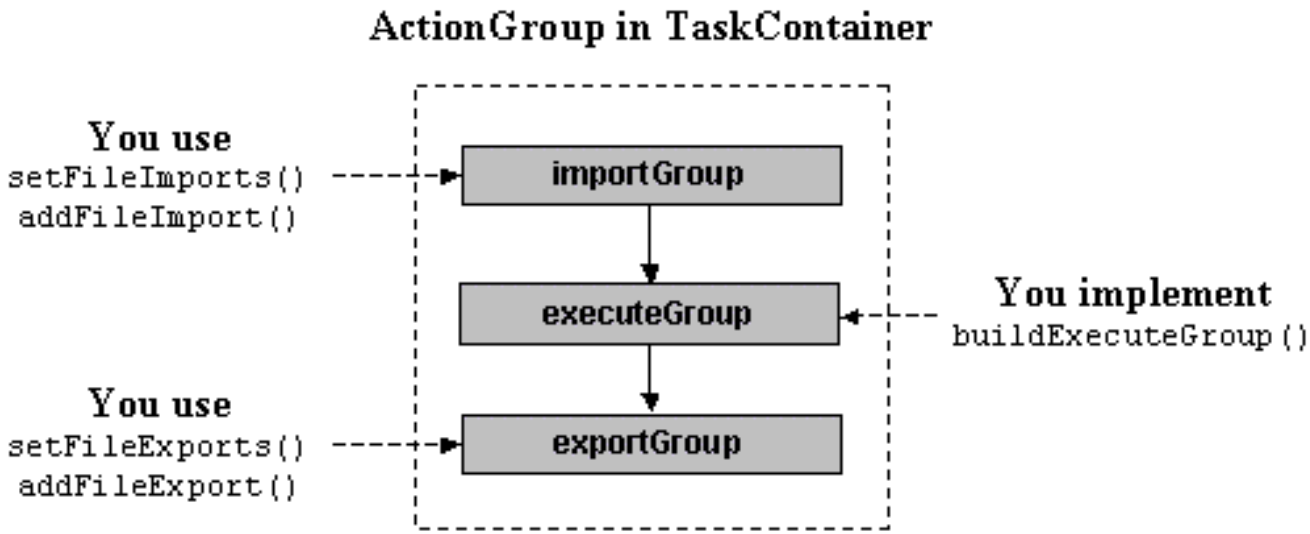
- AJO is the low-level „UNICORE language“
- Client containers encapsulate complex AJOs



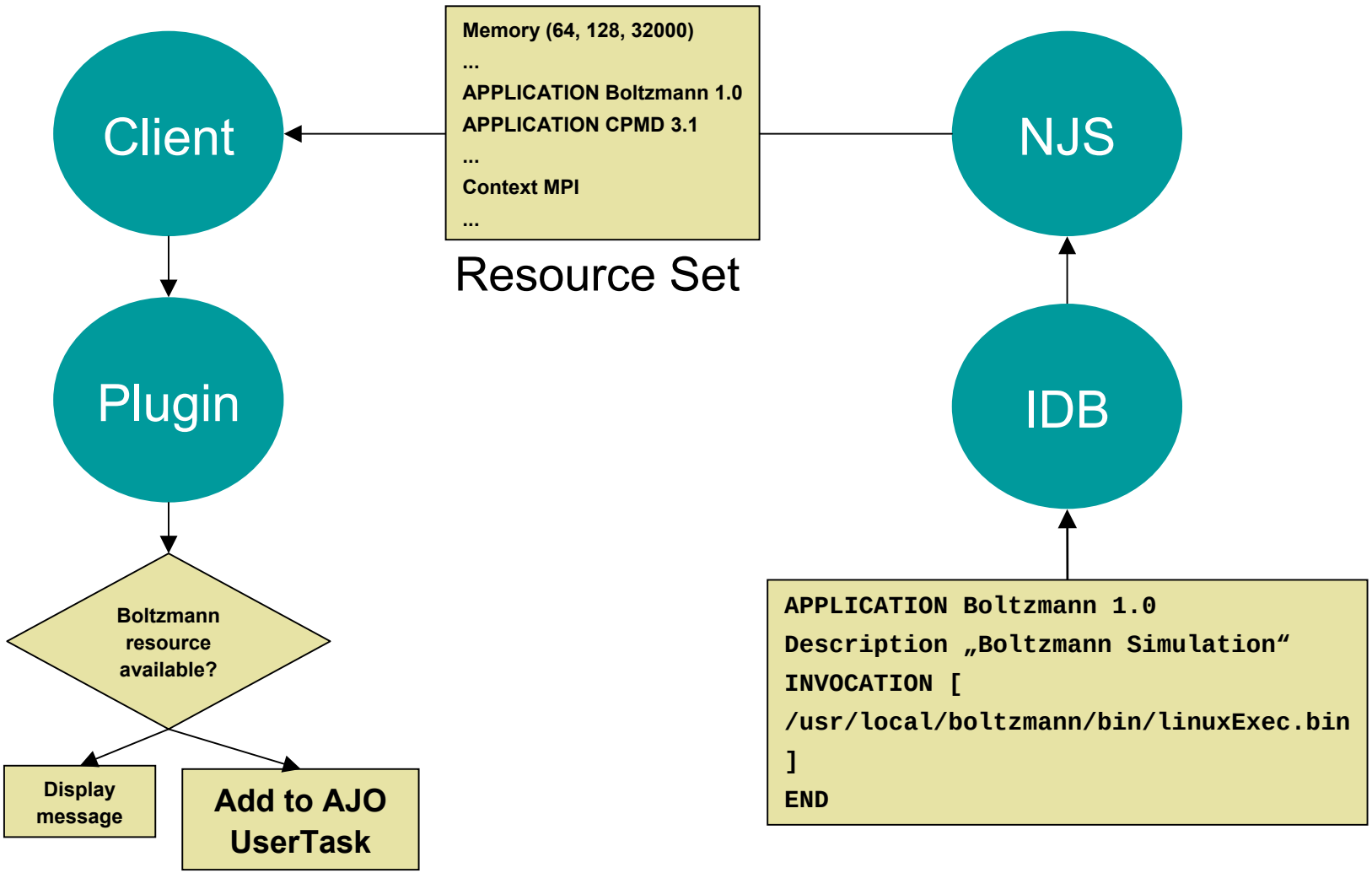
Container Hierarchy



Implementing the Container

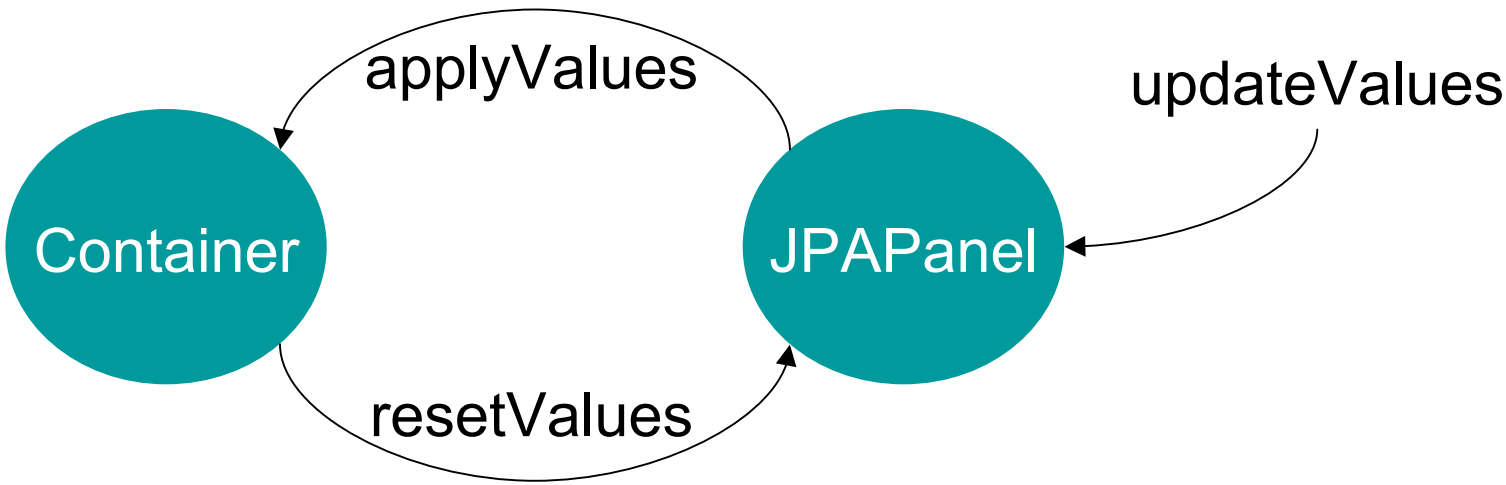


Using Application Resources



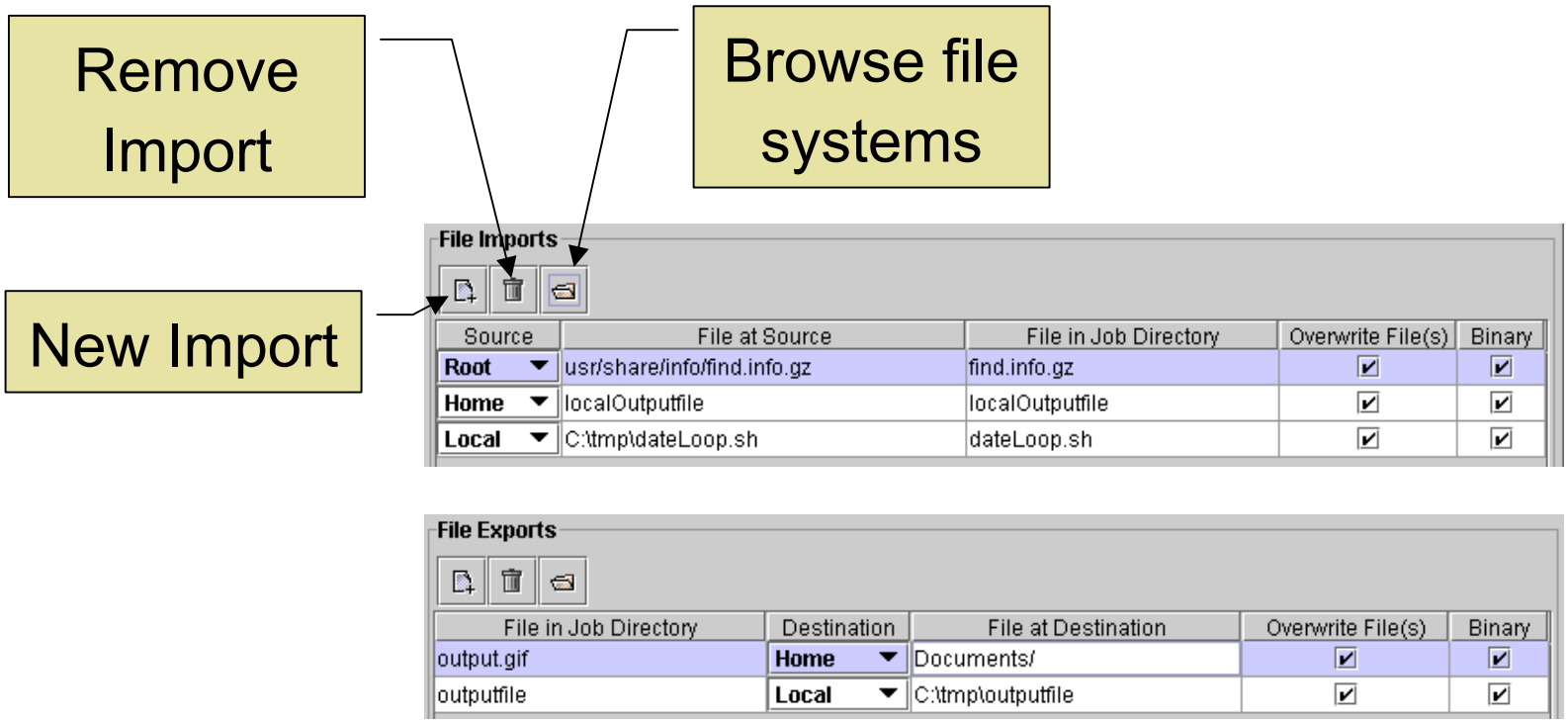
JPAPanel

- Set parameters in container
- Document/View paradigm
- Sub class of javax.swing.JPanel
- Implements interface Applyable
- Follow *Java Look and Feel Design Guidelines*



Import and Export Panels

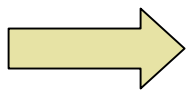
- Specify file imports and exports from the GUI
- Use out of the box



Step 2: Writing the Boltzmann Plugin

- Execute the application with an AJO UserTask
- Specify input file in import panel
- Specify output file in export panel

1. Unpack Code
2. Compile Code
3. Build Jar
4. Sign Jar
5. Deploy Jar
6. Run Client



GO!

Remote Text Editor

- Load, edit and save files from remote and local file spaces
- Use out of the box

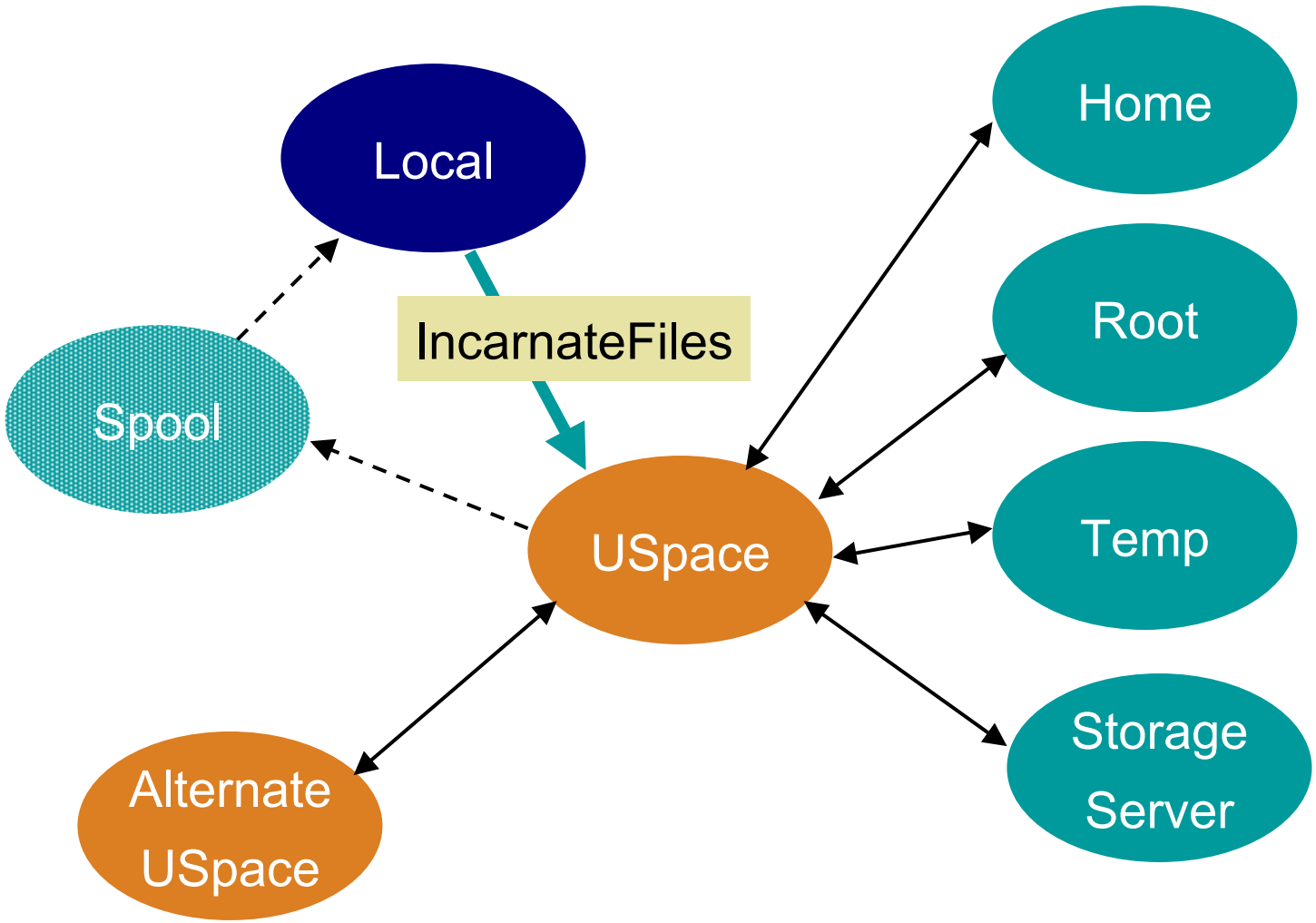
```
public class PluginJPAPanel extends JPAPanel {
  private PluginContainer container;
  private RemoteTextEditor textEditor;

  private buildComponents() {
    textEditor = new RemoteTextEditor();
    JScrollPane editorScrollPane =
      new JScrollPane(textEditor);
  }

  public void applyValues() {
    container.setText(textEditor.getText());
  }

  public void updateValues(boolean vsiteChanged) {
    if(vsiteChanged) {
      textEditor.setVsite(container.getVsite());
    }
  }
}
```

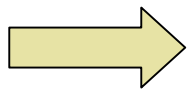
File Transfers in the AJO



Step 3: Transferring input and output files

- Edit the input file with the RemoteTextEditor
- Plugin sends the input file with IncarnateFiles
- User adds output file in export panel

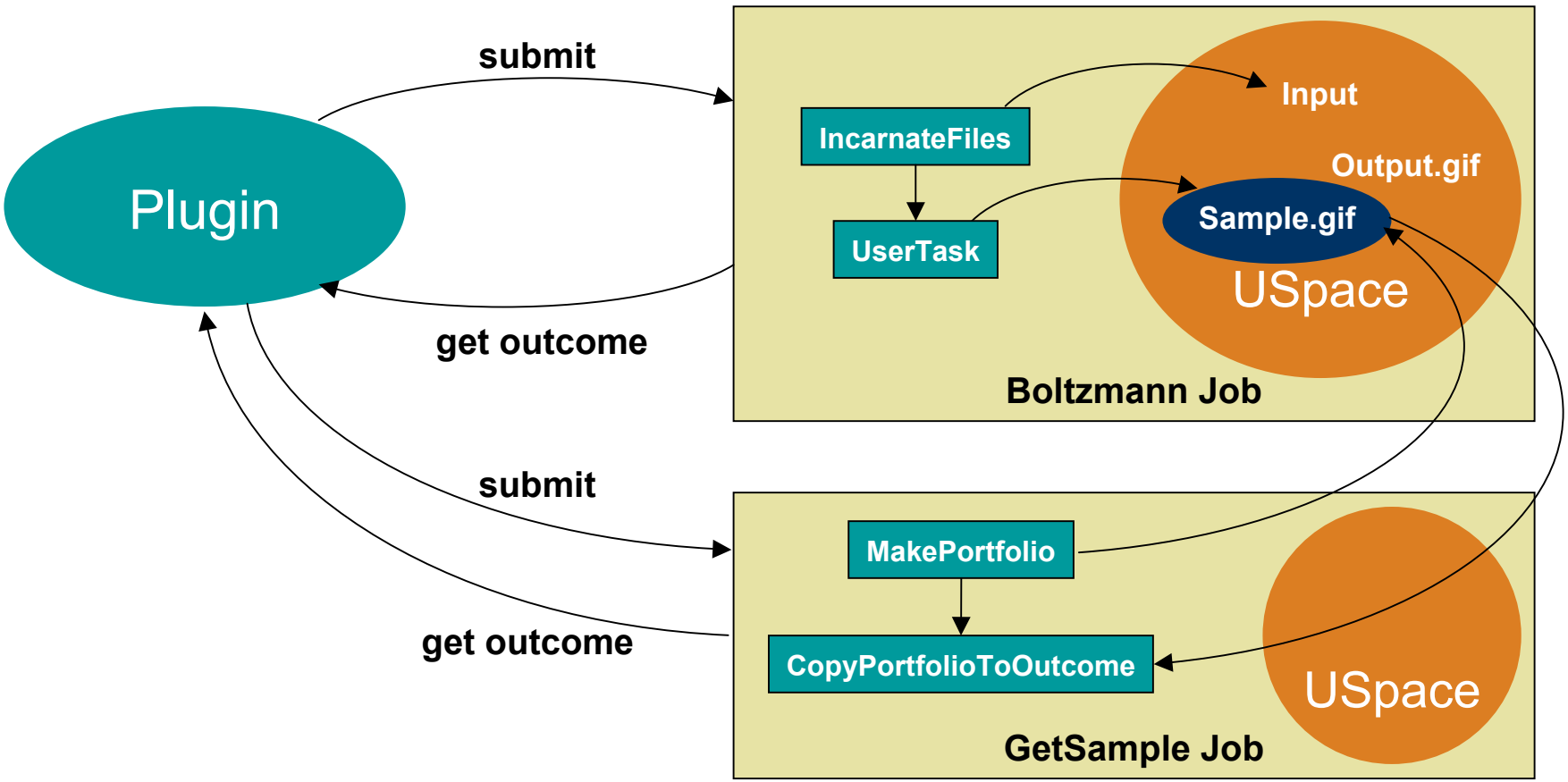
1. Unpack Code
2. **Add IncarnateFiles task to execution ActionGroup**
3. Compile Code
4. Run Client



GO!

AJO Portfolios

- Wrap files in Uspace in portfolios
- Pass portfolios between tasks



Additional outcome panels

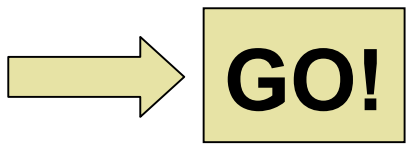
- Make your outcome panel a sub class of JPanel
- Implement interface IPanelProvider in Container
- Implement interface IApplyable in outcome panel

Use `com.pallas.unicore.client.panels.ImagePanel` to display sample.gif

Step 4: Getting intermediate results

- Get sample files with MakePortfolio and CopyPortfolioToOutcome (use GetFilesFromUSpace!)
- Visualize sample files in additional outcome panel

1. Unpack Code
2. Add GetFilesFromUspace request
3. Compile Code
4. Run Client



Step 5: Free-Style

- Write a Boltzmann Wizard
  - Add GUI elements to specify input parameters
  - Generate input file from GUI entries
- Automatically export output.gif
  - Add a FileExport object in Plugin Code
- Send Control files to running application
  - Add a control panel to outcome area
  - Write a SendFilesToUspace request
- ...???