

Wahlzeit Design

Prof. Dr. Dirk Riehle

Friedrich-Alexander University Erlangen-Nürnberg

ADAP A03

Licensed under [CC BY 4.0 International](https://creativecommons.org/licenses/by/4.0/)

Overall Architecture

- Wahlzeit is a servlet-based web application
- Java objects are saved to a PostgreSQL database
- The architecture follows a model-view-separation style

Technical (Three-Tier) Architecture

- Client (browser)
- Application (application container)
- Database (database container)

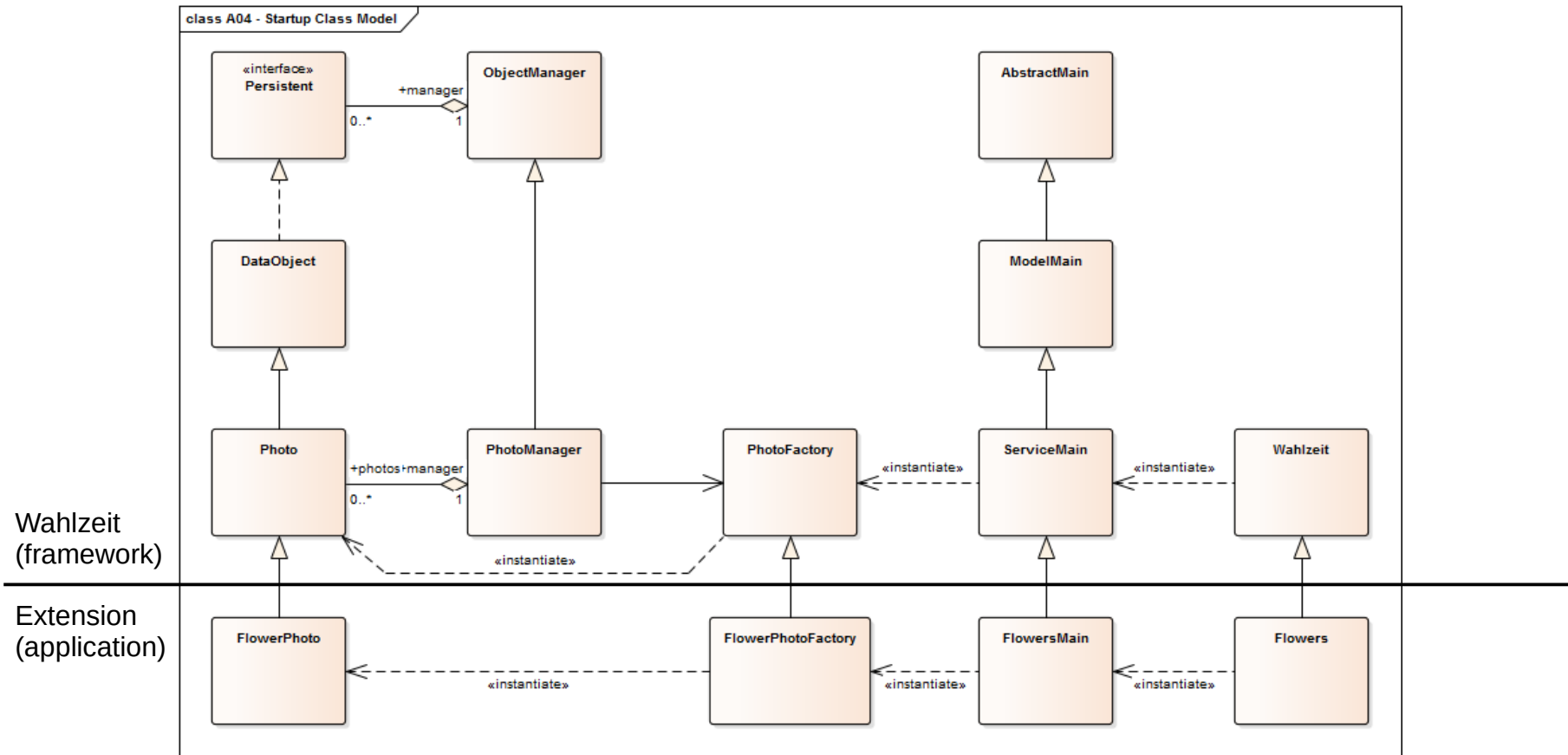
Logical (Three-Tier) Architecture

- User interface (view)
- Domain model
- Database access layer

Application Startup

- Wahlzeit (org.wahlzeit.apps)
 - A simple class hooked into the servlet container as listener
 - Listens to initialized and destroyed events
 - Delegates application startup and shutdown to Main class
- Main (org.wahlzeit.main)
 - A class hierarchy that handles system startup and shutdown
 - AbstractMain has different subclasses for different startup scenarios
 - ServiceMain represents the main web service application
 - Starts-up all services; shuts them down upon request
 - ScriptMain provides a single faceless startup/shutdown cycle
 - Used to run scripts, for example, to migrate database schema

Application Startup Class Model



- Servlets (org.wahlzeit.servlets)
 - Default servlet handles static resource requests
 - Main Wahlzeit servlet handles all dynamic content requests
 - Has been configured with handlers per request type
 - Dispatches request to proper handler
- Handler (org.wahlzeit.handlers)
 - One handler for each page type of the application
 - Receives request information, performs handler-specific action
 - Knows how to call the domain model

Web Page Generation

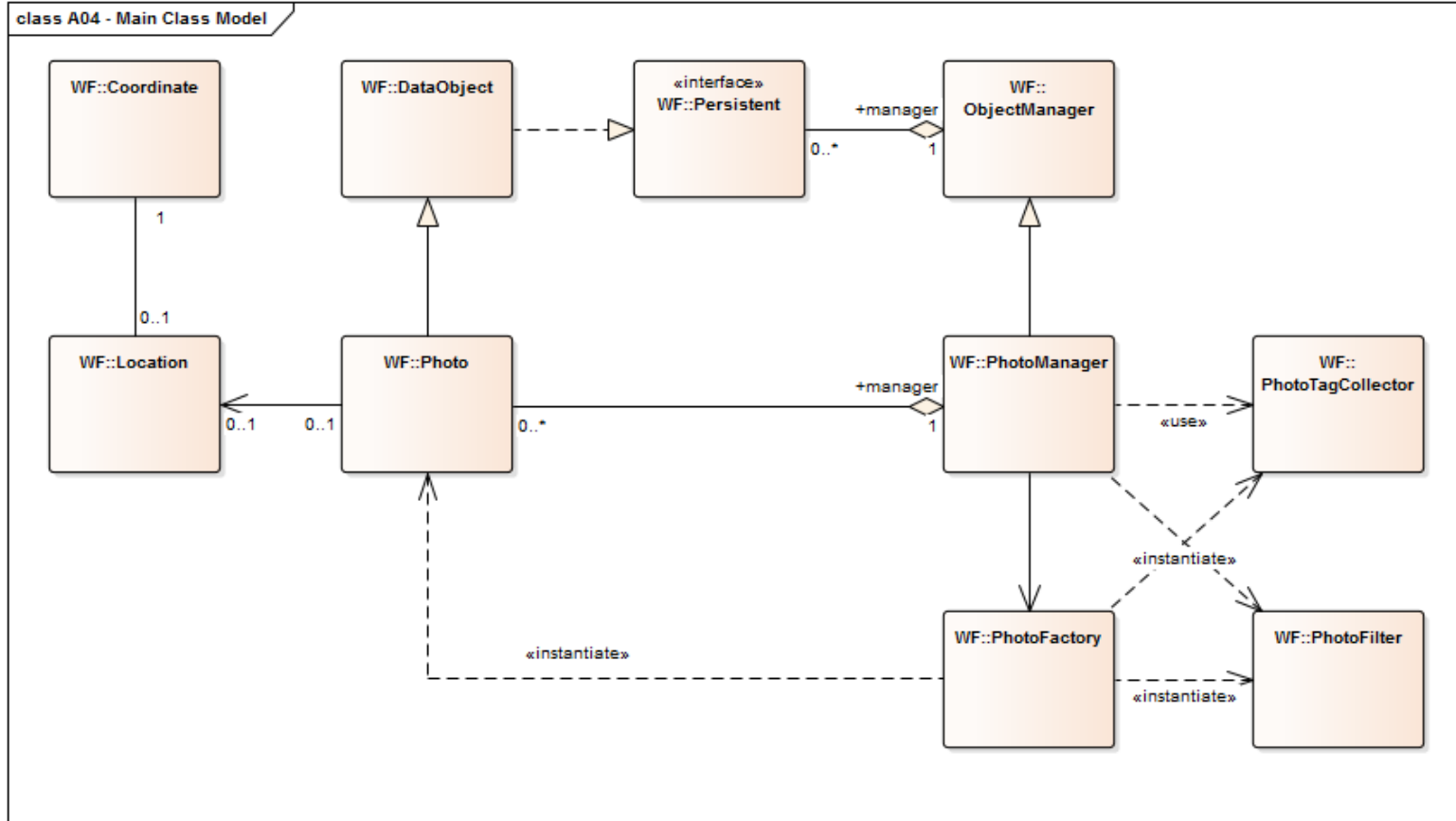
- **Handlers (org.wahlzeit.handlers)**
 - One handler for each page type of the application
 - Is configured with a web page (HTML) template
 - Requests templates and builds the web page
 - Utilizes a UserSession for a user's session state
- **WebParts and Templates (org.wahlzeit.webparts)**
 - A web-part is an object wrapping an HTML component
 - Is generated from a web-part template
 - All web-part templates are loaded from the file system
 - The WebPartTemplateService provides those templates

Access Rights

- Client (org.wahlzeit.model)
 - Each visitor is represented by an object from the Client class hierarchy
 - Has appropriate AccessRights associated with it
- Handler (org.wahlzeit.handlers)
 - Each handler knows about the current user by way of the UserSession
 - Each access to a web page or a web-part is checked against user rights

- Domain abstractions (org.wahlzeit.model)
 - Package contains all domain abstractions
 - Client hierarchy for visitors, logged-in users, moderators, administrators
 - Photo class hierarchy for photos
 - PhotoCase for cases filed against photos (copyright violation etc)
 - Various value object classes, e.g. language, status, gender
- Manager (org.wahlzeit.model)
 - An ObjectManager manages a particular domain abstraction (hierarchy)
 - UserManager manages the User class hierarchy objects, etc.
 - The object manager also hides the database access layer

(Part of) Domain Class Model



Object Persistence

- Persistent (org.wahlzeit.services)
 - Defines interface for reading and writing objects from storage
 - Provides dirty flag to indicate that object needs to be saved
- ObjectManager (org.wahlzeit.services)
 - Manages DataObject (implements Persistent) instances
 - One instance (of subclass) for each type of DataObject (subclass)
 - Encapsulates storage layer access

System Configuration

- SysConfig (org.wahlzeit.services)
 - A key/value store with basic system configuration data
 - Provides key directories and URLs
- ModelConfig (org.wahlzeit.model)
 - A key/value store with model configuration information
 - Loaded from properties file
 - One for each language (currently only 'en' and 'de')
 - Provides language-specific text message formatting
- ConfigDir (org.wahlzeit.services)
 - Directory abstraction that provides custom extension mechanism

Session Management

- Session (org.wahlzeit.services)
 - A session object maintains one database connection
 - For each active thread, one session object will be active
 - Session objects get allocated when thread becomes active
- SysSession (org.wahlzeit.services)
 - A session associated with faceless system threads
- UserSession (org.wahlzeit.services)
 - A session associated with each currently active user
 - Maintains user's session state, e.g. form input data

Information Logging

- Logging (org.wahlzeit.services)
 - Log classes provides logging functionality
 - Ultimately delegates to log4j
 - Eventually, log4j will replace Log
- User logging (org.wahlzeit.model)
 - Provides user-level logging
- System logging (org.wahlzeit.services)
 - Provides system-level logging

- EmailService (org.wahlzeit.services.mailing)
 - Provides interface for sending email, various implementations:
 - SmtplibEmailService actually sends email
 - LoggingEmailService wraps email service and logs before sending
 - MockEmailService drops any request; needed for testing
- EmailServiceManager (org.wahlzeit.services.mailing)
 - Provides global email service instance
 - Can be configured for different execution scenarios (testing vs production)

System Agents

- Agent (org.wahlzeit.agents)
 - An agent is a thread performing some faceless system functionality
 - Runs in the background, sleeps most of the time
- AgentManager (org.wahlzeit.agents)
 - Manages available agents, wakes them up

Photo Praise Notification

- PraisePhotoFormHandler (org.wahlzeit.handlers)
 - If a photo owner requested praise notification, queues praise event with agent
- NotifyAboutPraiseAgent (org.wahlzeit.agents)
 - Agent receives praise requests from handler
 - Sends out praise notifications in regular intervals

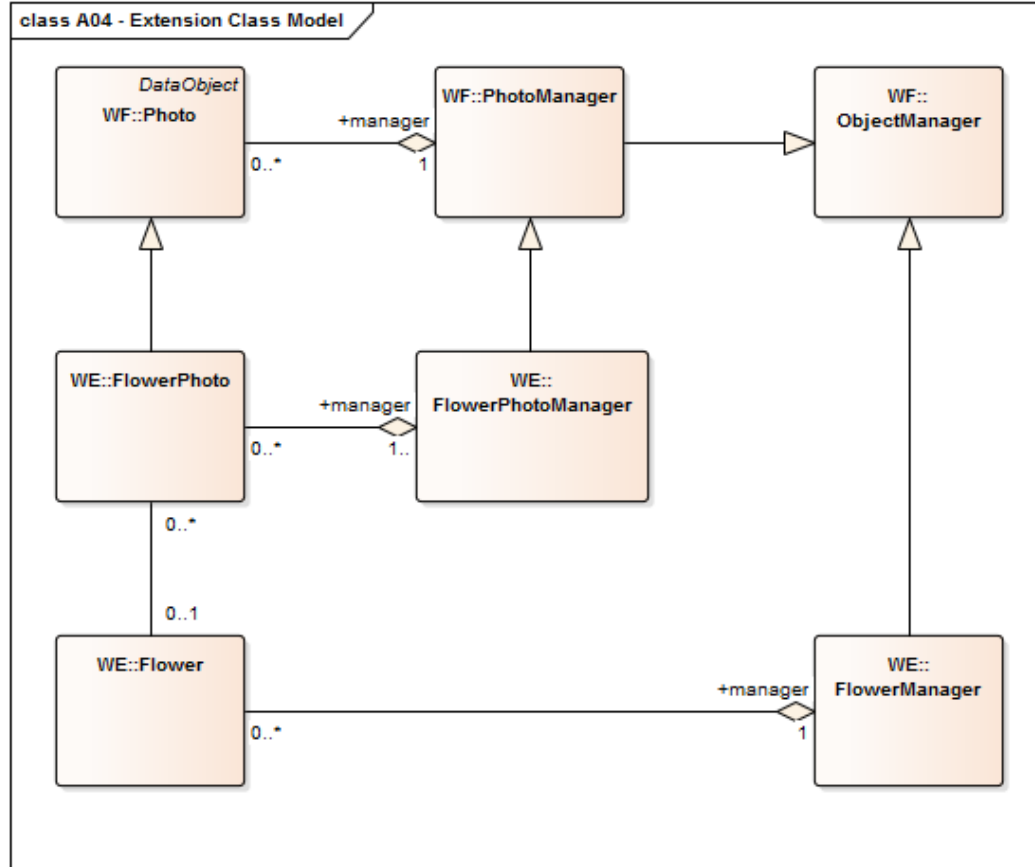
Application Shutdown

- **ShowAdminPageHandler** (org.wahlzeit.handlers)
 - Administrators can request system shutdown
 - Handler will request ServiceMain to shut down
- **Wahlzeit** (org.wahlzeit.apps)
 - Listens to servlet container
 - Upon destroyed event, tells ServiceMain to shut down
- **ServiceMain** (org.wahlzeit.main)
 - Saves objects, closes database connections upon request

Extending Wahlzeit

- Photo and PhotoFactory
 - At a minimum, these classes need to be extended for your domain
- Wahlzeit application startup
 - In addition, you need to create instances of your photo factory

(Part of) Extending Wahlzeit Class Model



Some Known Shortcomings

- User interface handling is simple but incomprehensible :-(
- A few too many singletons; can and should be simplified
- For more, see <https://github.com/dirkriehle/wahlzeit/issues>

Thank you! Questions?

dirk.riehle@fau.de – <https://oss.cs.fau.de>

dirk@riehle.org – <https://dirkriehle.com> – [@dirkriehle](#)

Legal Notices

- License
 - Licensed under the [CC BY 4.0 International](#) License
- Copyright
 - © 2012-2021 Dirk Riehle, some rights reserved