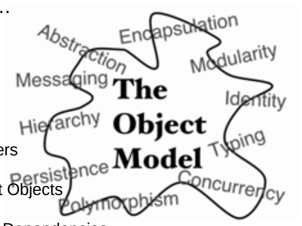
Embrace Factories

by Rob Gonda

Brief History of OOP for CF

- ✓ Once upon a time…
- ✓ Procedural Code
  - ▪ Spaghetti Code
  - ▪ Organized
    - a) Includes
    - b) Modules
- ✓ OOP / CFC (mx+)
  - ▪ Objects as containers
  - ▪ The Big Object
  - ▪ Scoped / Persistent Objects
  - ▪ Encapsulation?
  - ▪ Relations / Wiring / Dependencies



OOP: The Object

- ✓ Basics
- ✓ Lifecycle of a CFC
- ✓ Constructors / Workarounds
- ✓ Types of Objects

OOP: The Object: Basics

- ✓ Class: A class abstractly defines a thing, including the thing's characteristics (attributes or properties), behaviors, or methods
- ✓ Object: A particular instance of a class.
- ✓ Method: An object's abilities – Function

OOP: The Object: Lifecycle

- ✓ Gets created → runs pseudo-constructor
  - ▪ Cfobject / createObject
- ✓ Gets initialized → CF has no constructor method. init() method commonly used
  - ▪ Returns the instance of the object (this)
- ✓ Use methods / functions
- ✓ Destroy component → CF has no deconstructor method.

OOP: The Object: Types

- ✓ Business Model Layer
  - ▪ Transient – stateful
    - a) People, places, and things
- ✓ Service Layer
  - ▪ Persistent – stateless
    - a) Services and infrastructure

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Problems

- ✓ Object Creation / Initialization
- ✓ Relationships / wiring
- ✓ Manageability / moving objects / keeping paths
- ✓ Cohesion / Loose coupling
- ✓ Unit Testing

Design Patterns Defined

- ✓ In software engineering, a design pattern is a general repeatable solution to a commonly occurring problem in software design.

The Object Factory

- ✓ Object with main role of collecting the information necessary to create an instance of the intended object's class and then to invoke that class's constructor.
- ✓ Typically quite simple and small.

The Factory Pattern

- ✓ The factory method pattern is an object-oriented design pattern. Like other creational patterns, it deals with the problem of creating objects without specifying the exact class of object that will be created.

Why Factories

- ✓ Object Factory creates objects
- ✓ Centralize repository for path and dependencies
- ✓ All objects depend on the factory
  - ▪ Factory is passed to all objects
  - ▪ Objects request the factory for instances of other objects

Inversion of Control

- ✓ Inversion of Control, also known as IoC, is an important object-oriented programming principle that can be used to reduce coupling inherent in computer applications.

Dependency Injection

- ✓ Dependency injection (DI) is a programming design pattern and architectural model, sometimes also referred to as inversion of control or IoC, although technically speaking, dependency injection specifically refers to an implementation of a particular form of IoC.

Dependency Injection II

- ✓ Dependency injection is a pattern in which responsibility for object creation and object linking is removed from the objects themselves and transferred to a factory. Dependency injection therefore is inverting the control for object creation and linking, and can be seen to be a form of IoC.
- ✓ There are three common forms of dependency injection: setter, constructor, and interface-based injection.

Dependency Injection III

- ✓ Dependency injection is a way to achieve loose coupling. The technique results in highly testable objects, particularly when applying test-driven development using mock objects: Avoiding dependencies on the implementations of collaborating classes (by depending only on interfaces that those classes adhere to) makes it possible to produce controlled unit tests that focus on exercising the behavior of, and only of, the class under test.
- ✓ To achieve this, dependency injection is used to cause instances of the class under test to interact with mock collaborating objects, whereas, in production, dependency injection is used to set up associations with bona fide collaborating objects.

ColdSpring: what, why

- ✓ “Spring is the best thing to happen to **programming** in 20 years” – Antranig Basman, Reasonable Server Faces (RSF) Lead, SEPP Conference Vancouver 2006
- ✓ ColdSpring was “inspired” by Spring – not porting all the functionality, but solving the same problems.

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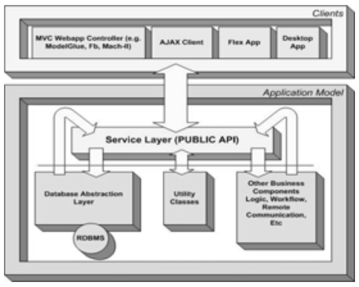
ColdSpring II: Definition

- ✓ ColdSpring is a inversion-of-control framework/container for CFCs that allows for constructors and setters dependency injection
- ✓ ColdSpring borrows its XML syntax from the java-based Spring Framework, but ColdSpring is not necessarily a "port" of Spring

ColdSpring III: Polymorphism

- ✓ Components don’t care about their collaborators implementation, thus we have a perfect environment for “swap-ability”.
- ✓ Swap one implementation of a component out for another and collaborators wouldn’t know the difference – the famous Duck-Typing
- ✓ Perfect for Unit testing: swap dependencies per abstract classes – based on interfaces

ColdSpring: Tiers, Layers


Clients
MVC Webapp Controller (e.g. ModelGlue, Fb, Mach-II)
AJAX Client
Flex App
Desktop App
Application Model
Service Layer (PUBLIC API)
Database Abstraction Layer
RDBMS
Utility Classes
Other Business Components Logic, Workflow, Remote Communication, Etc

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Code Examples: plain

- ✓ Scope components in application
- ✓ Since we don’t want to break encapsulation, each component re-initialize all dependencies
  - Needs to know how to initialize dependencies
  - Multiple instances of the class in memory

Code Examples: setters

- ✓ Scope components in application
- ✓ Use setters to pass instances of dependencies to each other.

Code Examples: factory

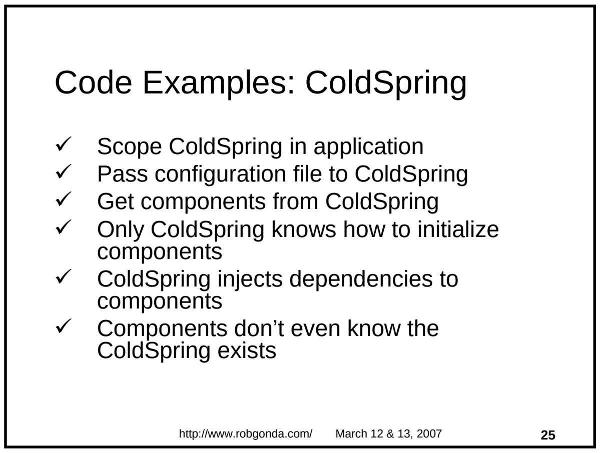
- ✓ Scope the factory in application
- ✓ Get components from factory
- ✓ Only factory knows how to initialize components
- ✓ Factory passes itself to components
- ✓ Components use factory to retrieve dependencies

Code Examples: factory DI

- ✓ Scope the factory in application
- ✓ Get components from factory
- ✓ Only factory knows how to initialize components
- ✓ Factory injects dependencies to components
- ✓ Components don’t even know the factory exists

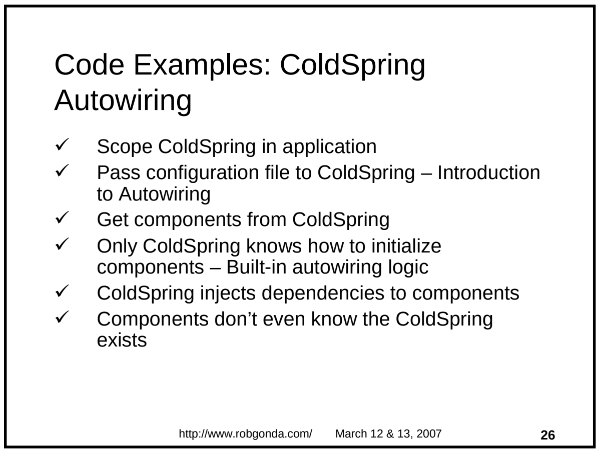
ColdSpring: The Config File

- ✓ Beans
  - ID
  - Class
- ✓ Dependencies
  - Property
  - Constructor



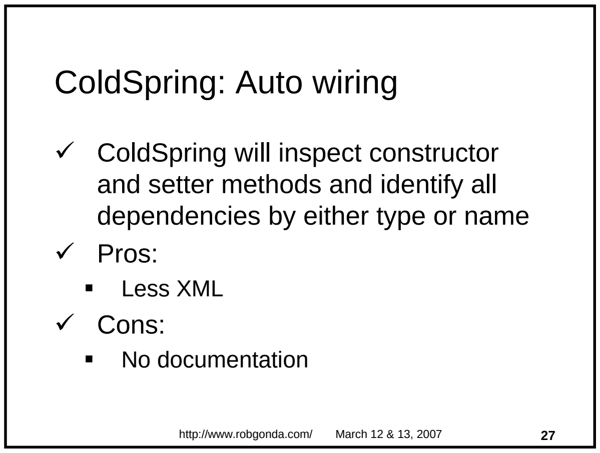
Code Examples: ColdSpring

- ✓ Scope ColdSpring in application
- ✓ Pass configuration file to ColdSpring
- ✓ Get components from ColdSpring
- ✓ Only ColdSpring knows how to initialize components
- ✓ ColdSpring injects dependencies to components
- ✓ Components don’t even know the ColdSpring exists



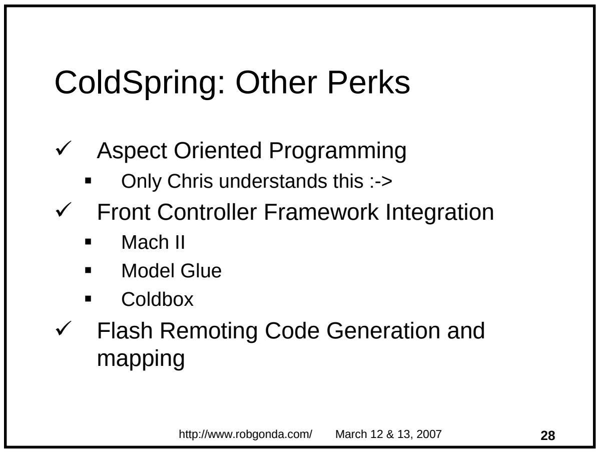
Code Examples: ColdSpring Autowiring

- ✓ Scope ColdSpring in application
- ✓ Pass configuration file to ColdSpring – Introduction to Autowiring
- ✓ Get components from ColdSpring
- ✓ Only ColdSpring knows how to initialize components – Built-in autowiring logic
- ✓ ColdSpring injects dependencies to components
- ✓ Components don’t even know the ColdSpring exists



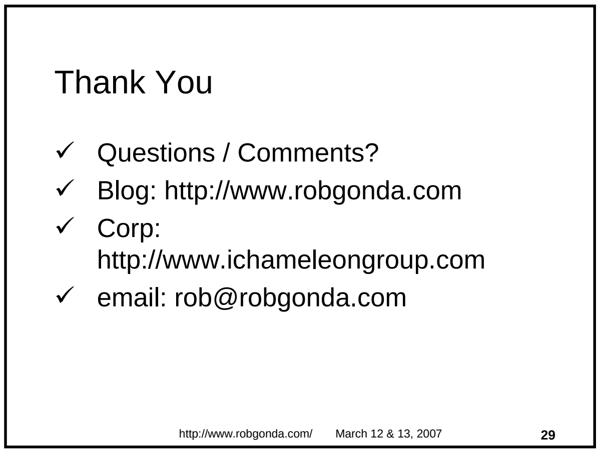
ColdSpring: Auto wiring

- ✓ ColdSpring will inspect constructor and setter methods and identify all dependencies by either type or name
- ✓ Pros:
  - Less XML
- ✓ Cons:
  - No documentation



ColdSpring: Other Perks

- ✓ Aspect Oriented Programming
  - Only Chris understands this :->
- ✓ Front Controller Framework Integration
  - Mach II
  - Model Glue
  - Coldbox
- ✓ Flash Remoting Code Generation and mapping



Thank You

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