

APPLICATIONS OF MODERN PROGRAMMING TECHNIQUES IN EXISTING CONTROL SYSTEM SOFTWARE*

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Convention over Configuration

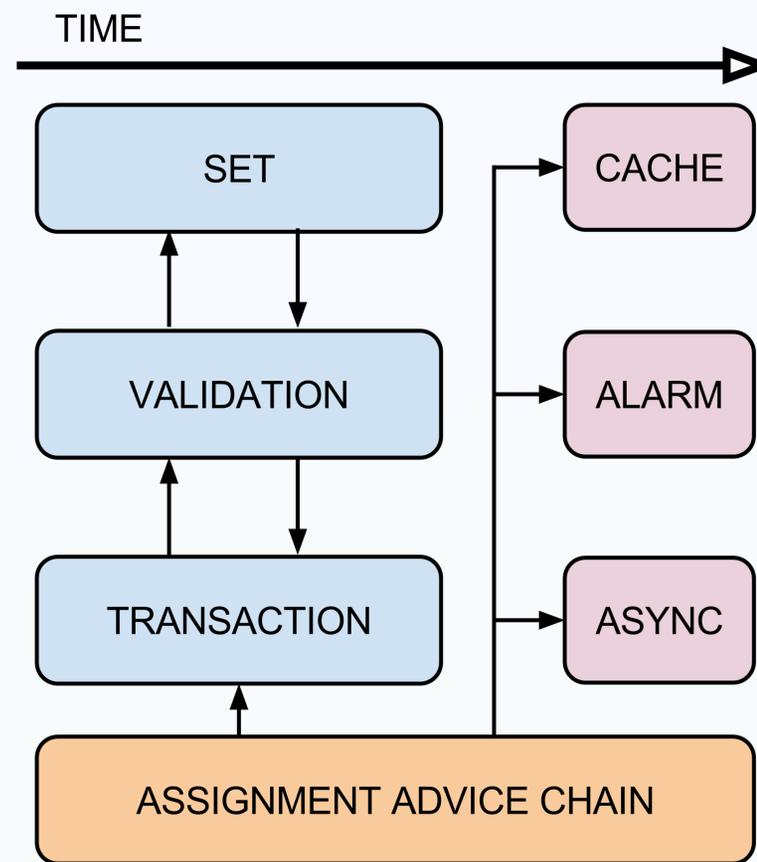
- No external configuration files
- Reasonable defaults
- Predetermined default actions
- Annotation driven
- Can override almost any default

AOP

- Advices around and after any property assignment
- Divided into chains for improved modularity
- User extendable (additional validation, post set triggers)
- Divided into mandatory (transactions, validation) and optional (async update) advices
- No need for value object wrappers
- Works with both primitive and aggregate types.
- AspectJ based

Dependency Injection

- Proxy based concrete implementation
- Resolving local and remote instances
- Context sensitive
- Javassist based bytecode generator



Transaction Support

- Modeled after EJB 3.x
- Annotation driven declarative model
- ACID within a supported container, non-atomic otherwise
- Suspend – Resume

Value Bonding

- Local – remote value entanglement
- Uni- or Bidirectional
- Asynchronous set or get
- Context sensitive

Set Advice Chain Example

- Around set transactional advice, which starts, suspends or resumes current transaction (if any). This aspect is also responsible for any possible rollbacks triggered by a potential unchecked exception.
- Around set validation advice, which runs a sequence of mandatory validators followed by a set of custom ADO specific checks. Any failure throws an appropriate exception, which discontinues both the validation and AOP processing for this set.
- Around set advice, which actually sets a value of the parameter.
- After returning asynchronous advice, which notifies any clients subscribing to the parameter about its state change.
- After returning caching advice, which stores a new value on a disk.
- After returning notification advice, which alerts the alarm system about parameter's transition to another alarm level.