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JSR-331

Constraint Programming API

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Constraint Programming - CP

- Constraint Programming (CP) is a proven optimization technology
- CP Solvers provide powerful tools to model and efficiently solve constrained satisfaction and optimization problems
- Today CP is used by real-world business applications in such areas as scheduling, planning, configuration, resource allocation, and real-time decision support
- However, the absence of standards still limits the acceptance of CP by the business world

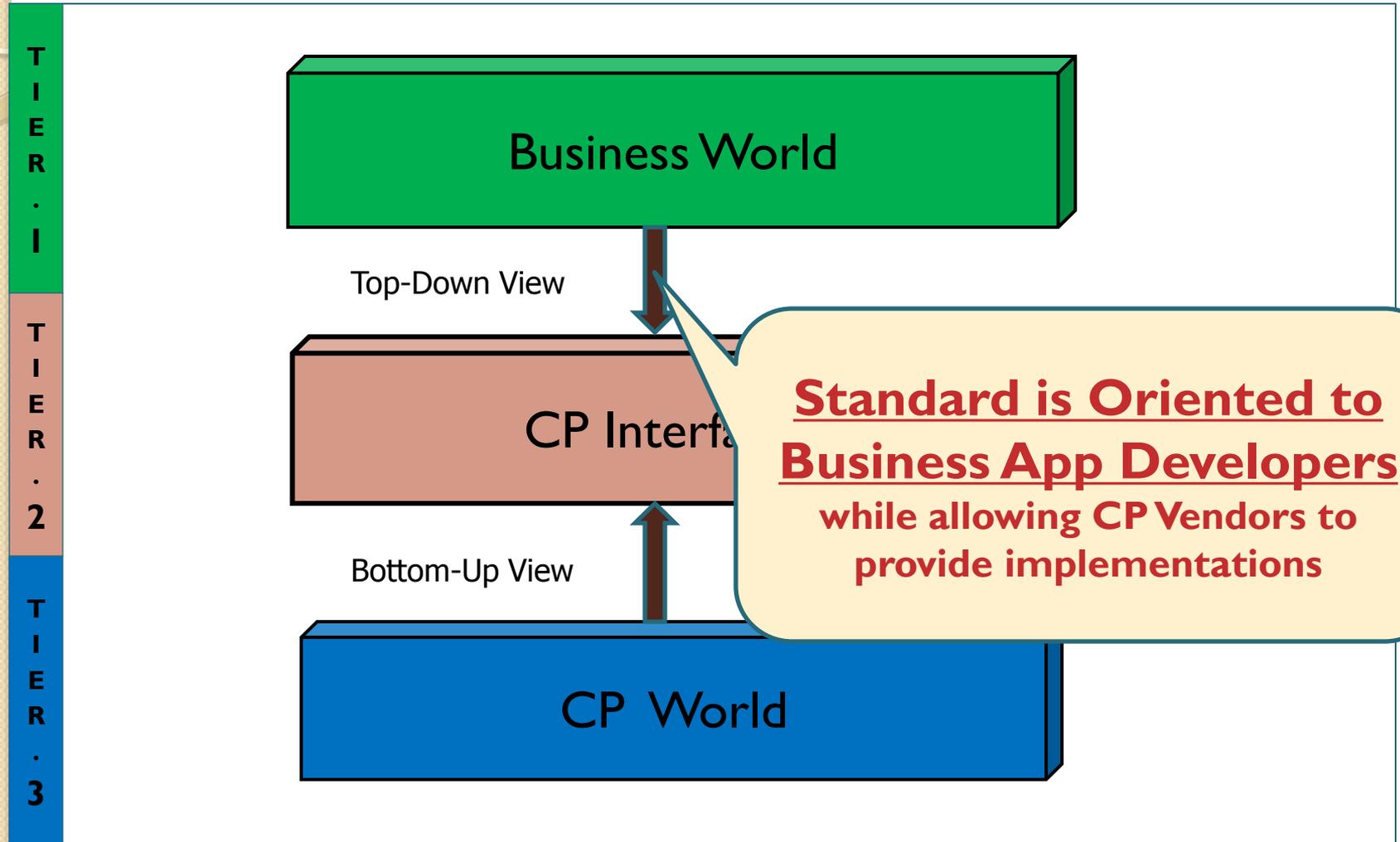
JSR-331 – Java Specification Request

- Java Constraint Programming API under the Java Community Process (JCP)

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- JSR-331 covers key concepts and design decisions related to the standard representation and resolution of constraint satisfaction and optimization problems
- Utilizes de-facto standardized design decisions from multiple CP solvers

CP Standardization Perspective



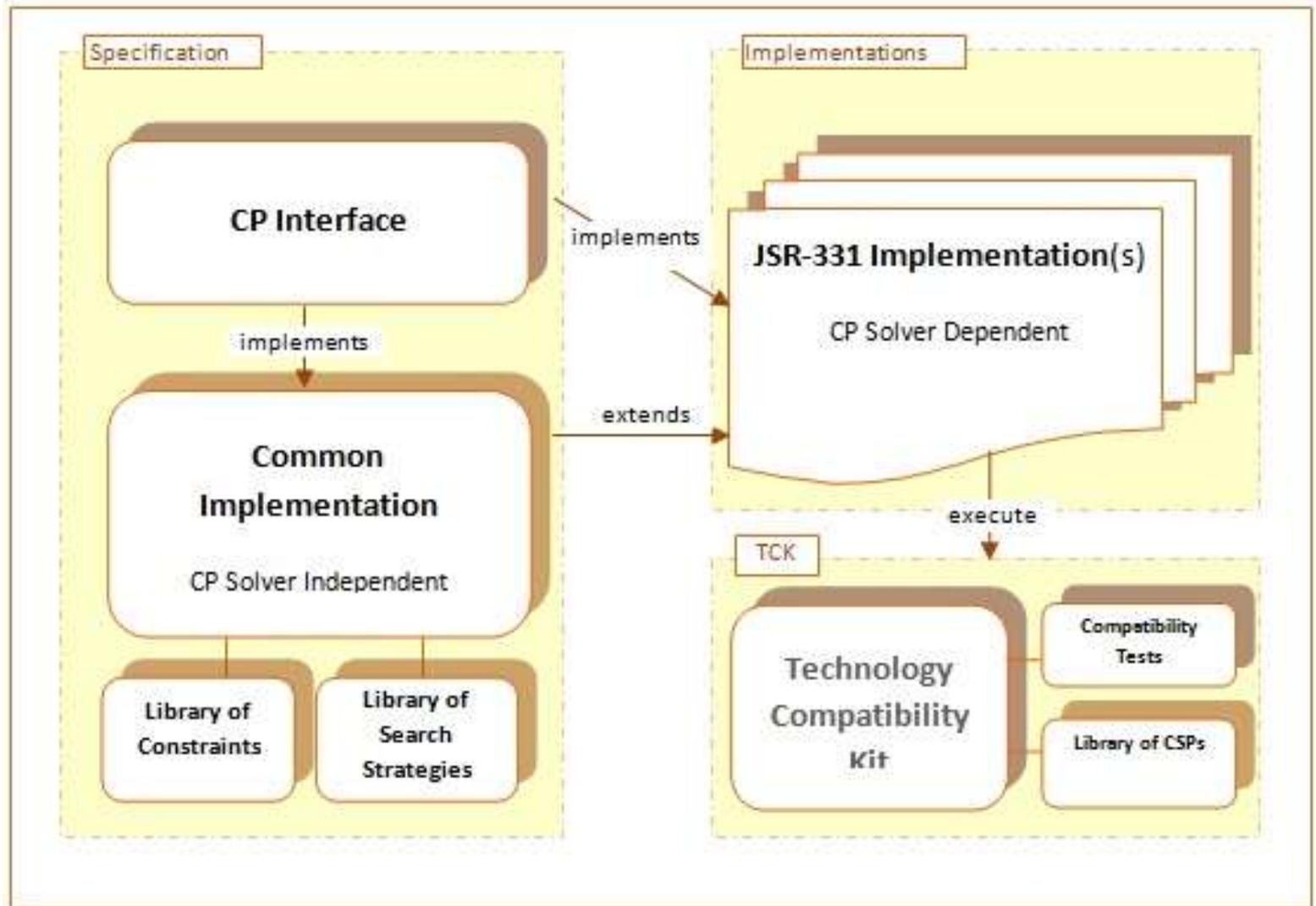
Key Objectives

- Make CP more accessible for business application developers:
 - Java Developers through API
 - Business Analysts through integration with Business Rules
- Allow a business application developer to easily switch between different implementation solvers without any changes in the application code
- Assist CP vendors in creating practical and efficient JSR-331 implementations

Community Input

- Constructive critique and contribution :
 - From CP vendors
 - Choco, IBM/ILOG, G12, JaCoP, Gecode, Constrainer
 - From CP experts
 - From Association for Constraint Programming (ACP)
- Important feedback from users who started to use preliminary JSR-331 releases

JSR-331 Architecture



Current State

- JCP Phase: Proposed Final Draft
- Detailed Documentation
 - Specification (Description and Javadoc)
 - User Manual
 - Many practical examples that can be tested
- Technology Compatibility Kit
 - Common Denominator - JUnit tests that all solvers should satisfy
 - A set of working well-known constraint satisfaction and optimization problems

Working JSR-331 Implementations

- From the very beginning we developed in parallel:
 - Specification
 - Implementations with examples and User Documentation
- Today we have:
 - Three tested working implementations using: **Choco™** or **JaCoP™** or **Constrainer™**
 - A new 4th (!) implementation based on **JSetL™**
 - All underlying CP solvers are open sourced

Integration with Modern Business Decision Management Systems

- Incorporations of Constraint Solvers with other BDMS components including:
 - Business Rules
 - Predictive Analytics
 - Complex Event Processing
- Use popular Business Rules interfaces to describe complex decisions with optimization components
 - orientation to Business Analysts instead of software gurus only