



BigLever Gears Product Line Engineering Tool and Lifecycle Framework™

Product Overview

For businesses to be competitive, today's development organizations must deliver a product line – a portfolio of similar products with variations in features and functions – rather than just an individual product. Systems and software product line engineering (PLE) is an innovative approach that enables organizations to develop, deliver and evolve an entire product line portfolio through each stage of the lifecycle with much higher degrees of efficiency than have been possible before.

BigLever Software's industry-standard Gears Product Line Engineering Tool and Lifecycle Framework allows you to engineer your entire product line portfolio as a single production system rather than a multitude of products. With this innovative "single system" capability, you can develop, evolve and manage your product line, smoothly and efficiently, through each lifecycle stage – from requirements to design, implementation, testing, delivery, maintenance and evolution.

The Gears Framework provides a set of industry-standard PLE concepts and constructs that augment your tools, assets and processes across the entire lifecycle:

- A *feature model* that you use to express the feature diversity (optional and varying feature choices) among the products in your product line.
- A *uniform variation point mechanism* that is available directly within your tools and their associated assets, to manage feature-based variations in all stages of the engineering lifecycle.
- A *product configurator* you use to automatically assemble and configure your assets and their variation points – based on the feature selections you make in the feature model – producing all of the assets for each product in your product line with the push of a single button.

Manufacturers have long employed analogous engineering techniques to produce a product line portfolio, using a single factory that assembles and configures parts designed to be shared across the product line. The powerful, though subtle, essence of this approach – for manufacturing and for software – is the focus on the single system rather than the many products.

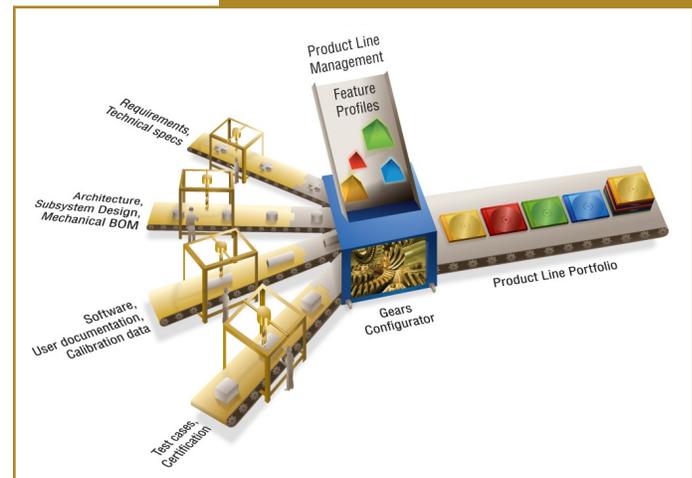
Once the production line is established, products are automatically instantiated rather than manually created. This consolidated system enables you to leverage order-of-magnitude improvements in time-to-market, development cost, portfolio scalability and product quality for an overwhelming strategic business advantage.

Pragmatic 3-Tiered PLE Methodology™

BigLever Software's innovative and pragmatic 3-Tiered PLE Methodology comprises three tiers of capabilities and benefits, where each tier builds upon and is enabled by the previous tier:

Base Tier: Feature-based Variation Management and Automated Production

Tools, integrations and infrastructure for engineering product line features, product feature profiles, product line hierarchy, feature-based variation points in assets, and automated feature-based configuration of product line assets into products and deliverables.



Middle Tier: Feature-based Asset Engineering

Processes and organizational structures for engineering the full lifecycle of product line assets – from requirements to architecture, design, implementation and test – on multiple delivery streams in a production line.

Top Tier: Feature-based Portfolio Management

Business-wide management of a product line portfolio by the features offered and the profile of features allocated to each product.



Gears Features

Gears Infrastructure: The Gears production line infrastructure consists of special-purpose metadata that is added to your systems and software assets in order to create a software production line. Features include:

- Variation points encapsulate the optional and varying software in your core software assets. They also contain logic that describes under what feature conditions varying software is included in a product.
- Feature declarations specify the features that can vary from product to product. They are described at the same conceptual level as domain requirements and provide model choices that can be made in defining your requirements for the products in your product line.
- Feature profiles define values for each feature declaration. These selections drive Gears to assemble and tune elements for each variation point. Given a feature profile, Gears automatically instantiates your variation points to fully compose and configure all of the assets needed for a particular product.
- Assets allow you to partition feature declarations and feature profiles according to modular boundaries in your application. Each asset can have separate feature declarations and feature profiles that apply to the customizations in that asset.
- Mixins allow cross-cutting feature declarations and profiles to be shared across multiple assets, avoiding duplication and inconsistencies when composing assets and product lines.
- Matrices define the feature profiles from each asset and mixin used by each product in the production line.

Gears Development Environment: The Gears development environment allows you to browse, create, organize, and maintain your production line infrastructure.

Gears Actuator: The Gears actuator activates your production line in order to produce varying instances of your products.

Gears Tools: Gears provides a collection of tools to help you understand, analyze, and manage the evolution of your product line. For example:

- Membership impact analysis for computing which assets and product instances contain an element of an asset.
- Statistics reports for monitoring production line metrics to ensure quality and measure the impact of product line engineering.

Gears PLE Bridge API: The Gears PLE Bridge API enables tool developers to create PLE bridges for making all of the tools you use “product line aware”.

BigLever’s Gears solution is at the center of some of the industry’s most innovative PLE success stories. With BigLever’s consulting services, you can learn the latest pragmatic PLE methods and best practices, determine your potential ROI and desired transition path, and integrate new PLE techniques and tools into your environment with minimal disruption. Contact BigLever at +1-512-426-2227 to request an evaluation or to discuss your PLE needs and challenges.

Features at a Glance

- Feature modeling language and editors
- First class, intelligent, encapsulated variation points
- Multiple variation point granularities
- Persistent and reusable product feature profiles
- Feature mixins to support cross-cutting features and profiles
- Fully automated feature-based product configurator
- Matrices to support asset composition
- Support for hierarchical product lines and product populations

Operating Systems

Operating systems include Windows, Solaris, Linux and Mac OS X.

Integration

The Gears PLE Lifecycle Framework is agnostic and extends rather than replaces your existing systems and software engineering toolset. Gears is compatible off-the-shelf with many of the industry standards in programming languages and compilers, integrated development environments, requirements management, change and configuration management, build systems, quality management, model driven development, word processors and documentation.

BigLever provides enhanced Bridge solutions for IBM Rational, Aras, PTC, Sparx Systems, MadCap Software, Serena, Microsoft, Perforce and Open Source tools.

The PLE Bridge API provided by Gears enables engineering tool developers to create PLE bridges that integrate their tools with the industry-standard Gears PLE Lifecycle Framework.

Installation Requirements

- Runs as a standalone Java application on developer desktops and build servers
- No database required

Execution modes

- Standalone GUI application
- Independent command line operations

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