



BIGLEVER NEWSLETTER: **GearUP Announcement**

## Introducing Gears 7.4 with Selective Actuation

### Greetings from Dr. Drew Stovall:

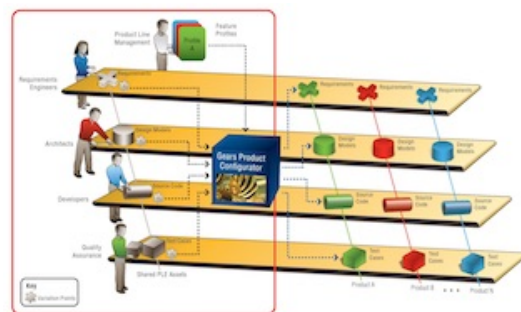
This month, BigLever Software is releasing Gears version 7.4. For all engineers working, every day, on engineering your product line's shared assets – this one is especially for you.

### First, some background about Gears

In case you're not familiar with Gears... BigLever's **Gears Product Line Engineering Tool and Lifecycle Framework™** allows you to define feature models for the products in your product line, bring in engineering assets for those products, and then *actuate* to automatically generate a product-specific set of those assets based on feature choices. *Features* are the distinguishing characteristics that set your products apart from each other. A *feature profile* describes a particular product by capturing the feature selections for that product. To generate a product, Gears uses that product's feature profile to configure the shared engineering assets you've hooked up to it -- such as requirements, design models, code, tests, documentation, plans, Bills of Materials, and so on. The result is a fully consistent set of asset instances configured to perfectly support the product to be produced, based on the feature profile you supplied.

The figure illustrates this, by showing four types of shared assets on the left, including requirements, design models, and so forth. (Click image to enlarge.) But, the possibilities go far beyond just those.

The shared assets on the left are "supersets," containing all of the information needed to support any product in the product line. Asset engineers – for example, requirements engineers, or coders, or testers – create and maintain the supersets. They build variation points (places where the shared asset needs to be different to support a particular feature), and write the Gears logic to exercise those variation points based on feature selections. Through Gears' many tool integrations,



>> [See Gears Production Line.](#)

### About this Newsletter

As BigLever Software's Vice President of Engineering, Dr. Drew Stovall oversees the architecture, development, and evolution of BigLever's core product offering – the **Gears Product Line Engineering Tool and Lifecycle Framework**.

In his *GearUP* newsletter series, Dr. Stovall provides a view into the latest product line engineering (PLE) capabilities delivered by the Gears solution, with insight into how these new capabilities can enhance your PLE deployment.

We appreciate your interest and welcome your feedback regarding your PLE challenges and issues.

### Gears in the News

BigLever's Gears solution was recently spotlighted by Brandon Lewis, editor for *Industrial Embedded Systems* magazine. In his article, **Human out-of-the-loop manufacturing**, Lewis explores the impact of Gears and PLE approaches on manufacturing. Here's an excerpt:

An alternative to standard PLM practices is the advent of PLE approaches that "front load" much of the decision making to the initial concept stage of manufacturing. Within this PLE approach, product marketing personnel are tasked with creating a "feature catalog" from which product engineering defines a "bill of features" that automatically computes necessary BOMs, as opposed to engineers developing BOMs later on that are tailored to particular features.

Not only does this methodology create transparency and centralize

engineers work on the shared assets using the engineering lifecycle tool they're accustomed to – DOORS, for example, or Visual Studio, or Rational Quality Manager, or many more.

## The Expanding Scale and Scope of Product Line Engineering

The capabilities in this new Gears release are motivated by the continually expanding scale and scope of product line engineering (PLE) that is now being adopted by customers in commercial practice.

BigLever's PLE tools and methods are now being deployed broadly across the entire enterprise in some of the world's largest corporations, building some of the world's most complex products and systems.

In these settings, PLE is managing the complexity of crosscutting and interacting feature variations for as many as thousands of features, in hundreds of subsystems, for tools and assets in tens of different phases and organizations in the systems engineering lifecycle, comprising hundreds of thousands of variation points, supported by thousands of engineers, to produce product line portfolios with millions of products annually, often in safety critical domains.

For the individual engineers working in these *mega-scale* PLE environments, the ability to narrowly and clearly focus on a particular engineering task – isolated from the unrelated details from thousands of surrounding assets, tools, features, engineers, subsystems, and products – is key. Widely used systems engineering techniques for isolation, such as modularity and decomposition, apply equally well with PLE. However, the crosscutting nature of PLE requires special treatment, particularly in mega-scale PLE settings. For example, understanding and testing the implications of a single feature enhancement might involve variation points in requirements, architecture and design models, source code, build scripts, automated unit test scripts, parts bill-of-materials, integration and acceptance test cases, product documentation, manufacturing codes, sales configurator expressions, and more.

Individual engineers working on a particular engineering task are most efficient and effective when they have fine-grained control to focus on the PLE facets that interest them the most.

## Now, there's Selective Actuation

Engineering a shared asset superset of any kind involves the edit-run-test cycle all engineers are familiar with. You add or modify variation points in the superset, write the logic for Gears to exercise them, ask Gears to produce a product-specific configuration, and validate the results.

In Gears 7.4, we've added Selective Actuation to keep this process as efficient as possible, particularly in mega-scale PLE settings. Selective Actuation lets you focus the Gears Actuator on specific assets. When you actuate a product, you can now select assets by type or by name, and Gears will actuate just those assets. Now you've got a focused, and faster, edit-run-test cycle geared exclusively to the shared assets you're working with.

knowledge of feature definitions, it also minimizes labor-intensive and error-prone BOM creation and component tracking, as feature profiles can be easily selected for different product variations.

An example of one such manufacturing architecture is the Gears Product Line Engineering Tool and Lifecycle Framework from BigLever Software. The Gears product configurator maps out the features defined for different variations of a product, with the line engineers then designing to specifications outlined in the bill of features. As a Java-based software solution, Gears is Operating System-agnostic and bridges with other applications to streamline development in a non-disruptive manner.

Automation is no longer a luxury within industry; it is a requirement. Developing complex product lines now demands a pragmatic approach to manufacturing that can abstract processes to improve operational efficiency. Product Line Engineering is one step in that direction.

>> [See full article.](#)

## ■ [New Gears Bridge Solution for MadCap Flare](#)

BigLever and Madcap have partnered to integrate MadCap's documentation management solution, Flare, with BigLever's Gears PLE solution. The new [MadCap Flare/BigLever Gears Bridge](#) optimizes document sharing and dramatically simplifies the complexity of documentation management for organizations that develop and deliver complex product lines.

The new integration solution combines the capabilities of Gears and Flare to provide a single, unified mechanism for end-to-end document management across each stage of the product engineering lifecycle, and

Of course, it's your whole product line engineering team that is more focused. While you're working on, say, requirements... your colleagues are doing the same thing in code, testing, and user documentation, and enjoying the same kind of focus from Gears on what matters to them.

## Selecting the Shared Assets

Let's take a closer look at Gears 7.4. The following screen shots provide a view into how Selective Activation works. (Click screenshots to enlarge.)

Selecting the shared assets to actuate is easy, and it's right there where you'd expect it – in the actuation dialog.

When selecting the product to actuate, just expand the options section to select the shared assets to actuate (1).

Asset types are listed on the left; specific assets and imported production lines are listed on the right. You can build your list by working on either side. For example, want to actuate just the DOORS data? You can select just the DOORS bridge on the left (2).

Want to actuate *just* your Code and Calibrations data? You can select just those assets on the right (3).

Want the DOORS modules *and* Code *and* Calibrations? No problem (4).

Want to actuate *just* the DOORS modules in just *some* of the imported production lines? Sure, you can do that too (5).

Want to actuate the same assets that you actuated last time? Gears will remember what you did last time and automatically selects those bridges and assets.

## Faster Cycles

The reactivation capability in Gears has always provided quick updates to the projection of an asset for the latest product. Selective actuation complements reactivation to provide quick updates to the projection of any

throughout business operations such as portfolio planning and definition, marketing, sales, manufacturing, deployment, service, and finely tailored documentation for end users.

As a result, organizations can streamline technical communications throughout product engineering and business operations to achieve new levels of efficiency.

>> [See press release.](#)

## PLE Case Studies

BigLever has played an instrumental role in the industry's most notable recent PLE deployments, working in collaboration with the world's largest product engineering organizations to deliver highly complex, mega-scale product lines. BigLever's customer engagements also include medium to small enterprises that face product line engineering complexity issues.

Our growing customer base includes the world's #1 automotive manufacturer, defense contractor, online vacation home rental company, and military training system family, as well as three Software Product Line Hall of Fame Inductees. We work with customers to create case studies, co-author articles and publish reports that demonstrate the impact of new generation PLE approaches and spotlight the most recent successful deployments.

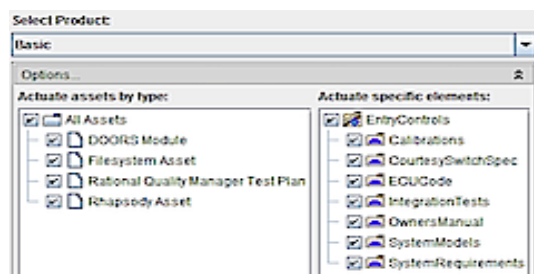
>> [See case studies.](#)

## Learn more about PLE

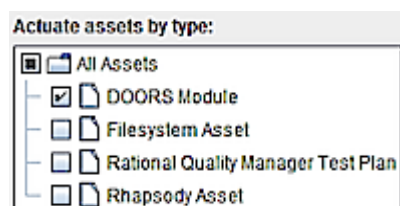
BigLever is committed to providing informational resources that allow companies to better understand, evaluate, and successfully leverage the breakthrough capabilities delivered by the latest PLE approaches.

The [BigLever website](#) offers a comprehensive collection of

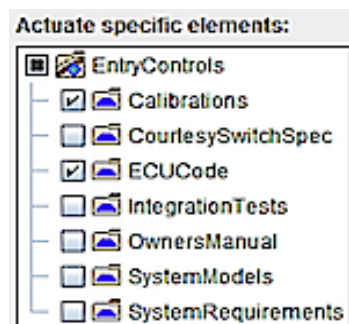
1: Actuate product dialog



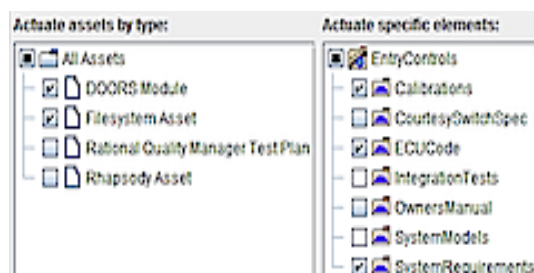
2: Select by asset type



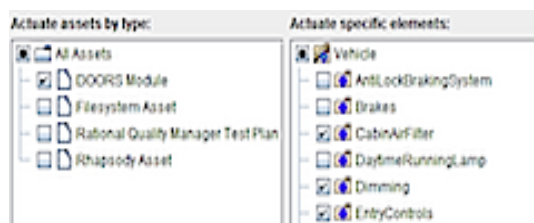
3: Select by asset name



4: Select by type and name



5: Select by type and production line



number of assets in any product. Quick updates means quicker testing and quicker results. The edit-run-test cycle has just sped up, you've just sped up, and that's a great thing.

If you would like more information about Gears 7.4, or to see a product demonstration, please contact us at [info@biglever.com](mailto:info@biglever.com).

Enjoy!

Best Regards,

Drew Stovall

BigLever Software Vice President of Engineering

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resources regarding the latest advances in PLE technologies and methods including white papers, articles, conference publications, and more.

>> [See learn more section.](#)

### ■ **About BigLever**

BigLever Software, Inc.<sup>TM</sup> is the leading provider of systems and software product line engineering framework, tools and services. BigLever's patented Gears<sup>TM</sup> solution enables organizations to reduce development costs and bring new product line features and products to market faster, enabling businesses to more reliably target and hit strategic market windows.

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