BigLever Feature-based Product Line Engineering Process Framework

At-a-Glance Overview

As Feature-based Product Line Engineering (PLE) matures and evolves into an enterprise-wide solution, it's increasingly important that organizations have a well-established framework for PLE deployment — a **Concept of Operations** (ConOps) template that lays out the organizational structure and puts that structure into motion by clearly defining PLE-related processes.

The **BigLever Feature-based PLE Process Framework**™, created in collaboration with Method Park, provides comprehensive guidance for enabling each group within an enterprise, and across the engineering lifecycle, to implement Feature-based PLE best practices using a standardized process template, thus avoiding the inefficiencies and pitfalls of ad hoc and one-off approaches.

onePLE

*A key part of BigLever's holistic **one**PLE solution, this framework is specifically designed to allow organizations to speed PLE adoption by leveraging a consistent, proven, off-the-shelf template of best practices.*

OVERVIEW

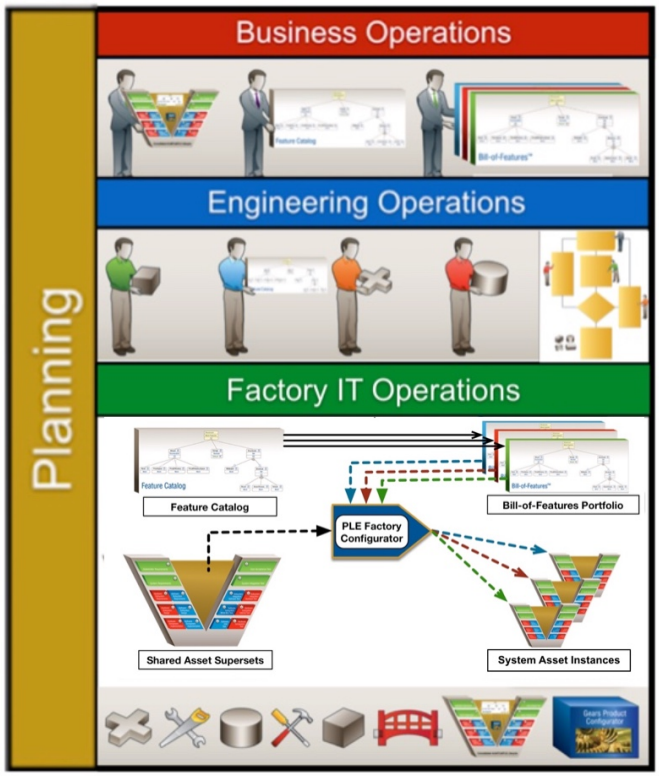
Feature-based Product Line Engineering relies on the concept of a PLE Factory. Once the factory is established, engineering assets for products are instantiated rather than manually created. Based on the feature choices for a product, BigLever's Gears PLE Lifecycle Framework™ configures the shared assets to create product-specific instances that, together, constitute the artifact set for one of the products in the product line. Configuring the shared assets for each product in turn produces the entire set of products.

Organizations use a ConOps, which is established as part of BigLever's **one**PLE™ solution, to define organizational roles, responsibilities and processes so that their workforce can effectively and unerringly stand up and operate their PLE Factory. Built using *Method Park's Stages Process Management System*, the BigLever Feature-based PLE Process Framework provides a starting point for creating the ConOps by modeling the processes that are tailored to the PLE organization, while adhering to the principles of Feature-based PLE, industry best practices, and new ISO PLE standards currently being developed.

REFERENCE MOEL FOR FEATURE-BASED PRODUCT LINE ENGINEERING

The Process Framework is structured to reflect the reference model for Feature-based PLE, shown here, based on BigLever's 3-Tiered Methodology for PLE. Each tier is manifested in the ConOps as a Process Group in Method Park's Stages:

- The **Business Operations** process group focuses on the people, roles, and processes that utilize and leverage the PLE Factory to achieve the *business objectives* of the enterprise. It provides the required processes for establishing the PLE Factory, guidance and support for executive leadership, and the necessary support for the PLE Factory during its operation.
- The **Engineering Operations** process group focuses on the people, roles, and processes that *operate* the PLE Factory. In combination with the Factory IT Operations process, the Engineering Operations process provides a fully operational Feature-based PLE Factory capable of producing the Application Asset Subsets for all of the products in a product line portfolio. Specifically, the Engineering Operations process includes all of the processes and operations necessary to create, maintain, and utilize the elements of the Factory IT Operations process.
- The **Factory IT Operations** process group puts in place and maintains the *tool and technology environment* to operate the PLE Factory. Components of the Factory include:
  - **Shared asset supersets**: Soft assets (engineering artifacts that can be represented digitally) that are shared across the products;
  - **Feature Catalog**: The set of features available to the product line, from which the Bill-of-Features for any individual product is constructed;
  - **Bill-of-Features Portfolio**: A set of specifications that define the products in the product line in terms of the features they contain;
  - **Gears PLE Factory Configurator**: Automation that applies a featured-based product specification (a Bill-of-Features) to the shared asset supersets in order to produce each product in the portfolio.
  - **System Asset Instances**, which are produced by the PLE Factory Configurator for verification, validation, and delivery.
- The **Planning** process group takes place throughout the Establish the PLE Factory phase and Operate the PLE Factory phase, and encompasses the planning of all aspects of Business, Engineering, and IT Operations processes.



Reference model for Feature-based Product Line Engineering

PHASES

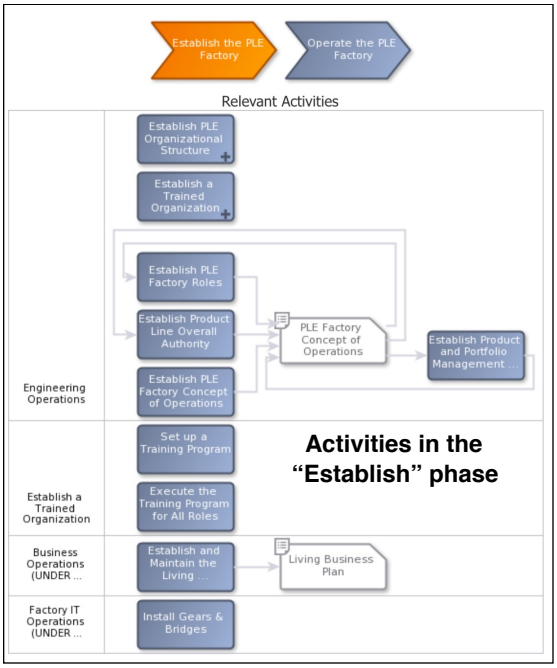
The ConOps captures the two phases related to the PLE Factory:

- The **Establish the PLE Factory** phase comprises a set of activities to set up the PLE Factory, such as creating the Living Business Plan and organizational adoption strategy for PLE; staffing the factory with trained engineering and management roles, updating existing processes with PLE methodology, creating the shared asset supersets, moving these supersets into the PLE factory, and more.
- The **Operate the PLE Factory** phase comprises all the processes and activities involved in the steady-state day-to-day operation of the PLE factory, such as maintaining the Feature Catalog, Shared Asset Supersets, and Bill-of-Features Portfolio, as well as management (including change management) tasks.

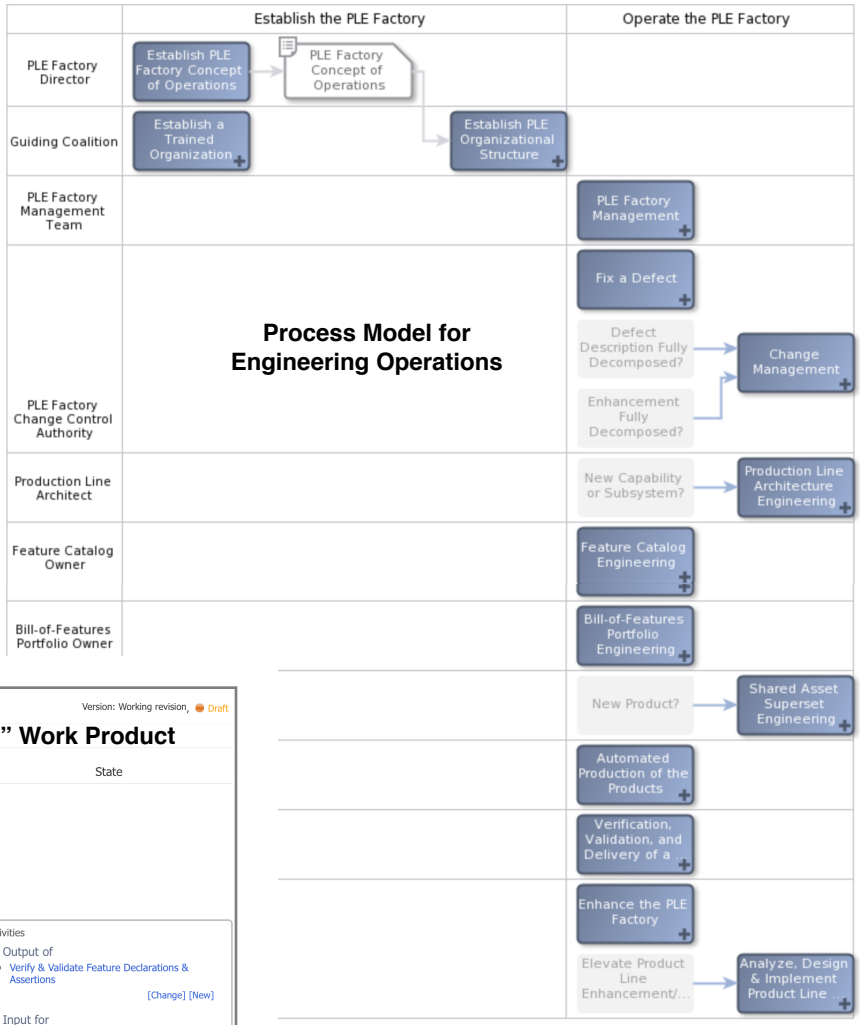
An organization typically moves back and forth between the two phases on a routine basis. For instance, when new people join an operating PLE Factory, their training is considered an Establishment activity.

PROCESS MODEL EXCERPTS AND EXAMPLES

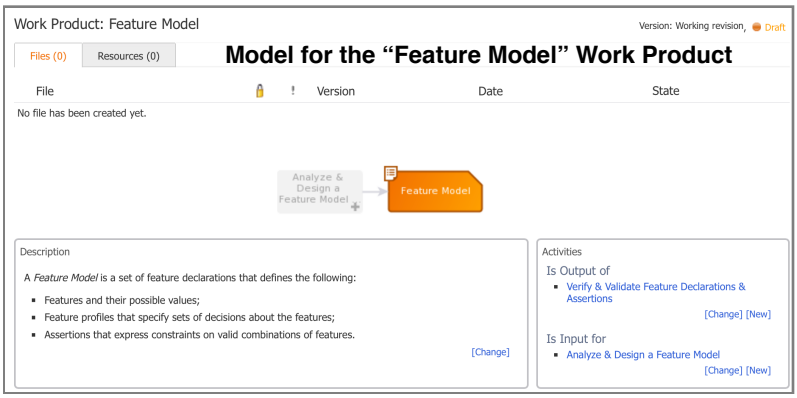
Role Definition for "PLE Factory Director"



Activities in the "Establish" phase



Process Model for Engineering Operations



Model for the "Feature Model" Work Product

For more information about the *BigLever Feature-based PLE Process Framework,* contact info@biglever.com.