

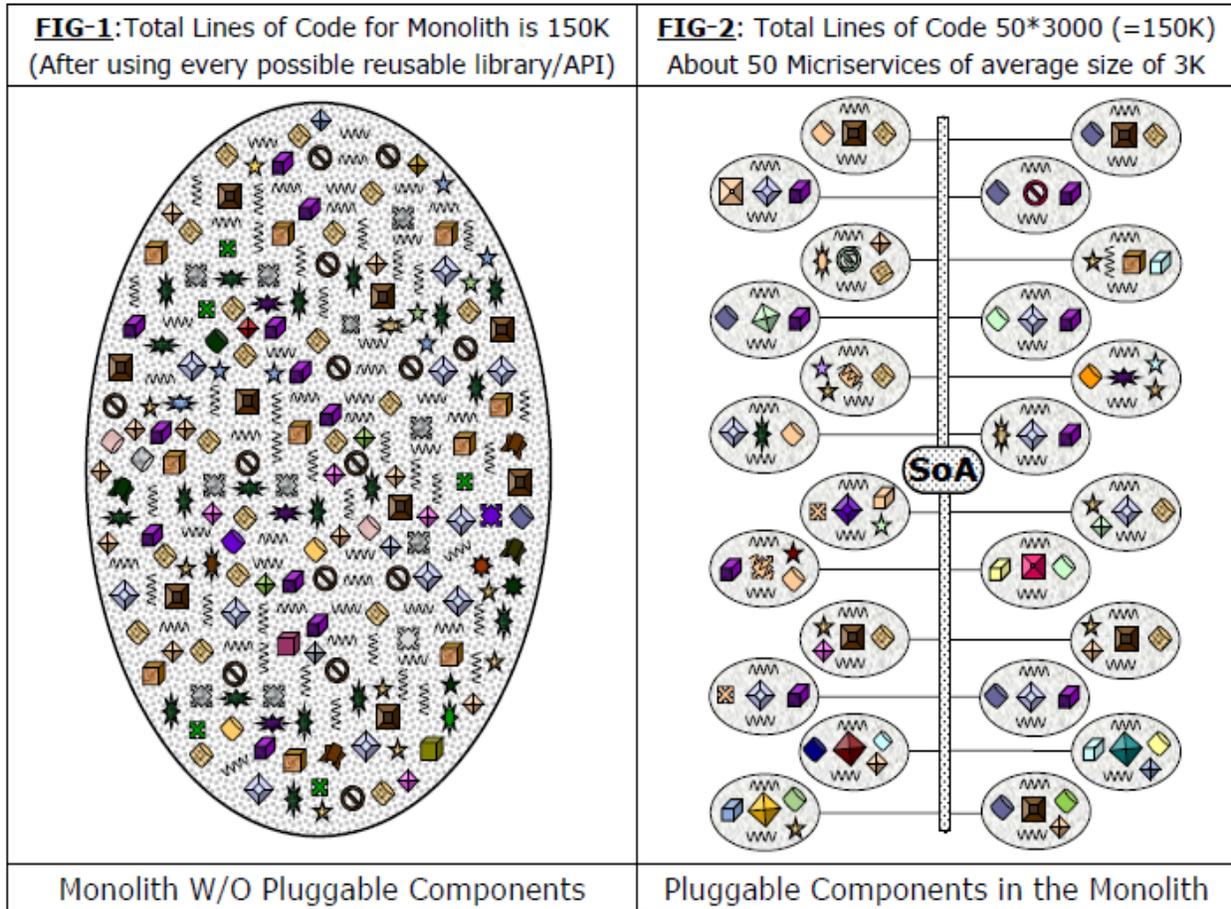
Executive Summary: Componentology — A New Hard Science to Replace Flawed Paradigms in Software Engineering

Humanity once lacked understanding of crucial fundamental realities. We did not know the true structure and motions of our planetary system—until Heliocentrism revealed the underlying objective reality by exposing the false pre-paradigmatic first principles on which the geocentric model was built.

Humanity did not understand the true causes of many infectious diseases—until the Germ Theory uncovered the objective reality by overturning similarly flawed first principles that had misled generations of physicians and scientists.

Today, the software engineering community remains similarly unaware of valid foundational first principles and objective reality: The structure and anatomy of physical CBPs (Component-based Products), and the essential characteristics and innate nature of components that are critical to constructing each product as a CBP.

To uncover these hidden objective realities regarding real components, CBPs, and the mechanisms of CBE, [we created Componentology](#)—a new hard science that challenges entrenched misconceptions and exposes what has long been misunderstood due to a false conceptual framework rooted in flawed pre-paradigmatic first principles, much like Heliocentrism and Germ Theory transformed their respective fields by dismantling illusory paradigms and correcting the erroneous assumptions that underpinned earlier scientific worldviews in astronomy and medicine.



Instead of relying on prevailing pseudoscientific misconceptions about so-called components and the methods or mechanisms for CBE (Component-based engineering), we established Componentology by grounding it in a set of empirically valid and indisputably verifiable facts, which serve as its core first principles:

Exhibit-A: Foundational truths to describe or understand the objective reality:

- [1] Foundational Truth (also known as First Principle): Any product can be a real-CBP (Component-Based Product) if and only if the product is built by assembling multiple real components, as illustrated in FIG-2 (each small oval shape represents a pluggable component).

- [2] Auxiliary Basic Truth: Any part can be a real component for building real CBPs if and only if the part can be assembled (i.e. multiple such real components are assembled or plugged in to build a real CBP as in FIG-2).
- [3] Auxiliary Basic Truth: Any engineering discipline or paradigm can be real CBE if and only if the discipline can design and build every large product as a CBP (i.e. by assembling or plugging in multiple real components, as in FIG-2).
- [4] Subsidiary Basic Truth: Components (e.g. devices such as CPU, DRAM, hard drive, software, or other electronic devices) that communicate or collaborate with each other by exchanging data and signals can be plugged in (e.g. into a printed circuit-board or system-board shown by SoA in FIG-2).

P.S.: Components can be broadly categorized into two types: (i) Pluggable components, such as electronic components that collaborate or communicate with each other by exchanging data or events/signals and can be crafted to be pluggable; and (ii) Moving components, such as mechanical components that are crafted for assembly, enabling movement in various mechanisms, and assembled into mechanisms that allow their movement. Software components belong to the category of pluggable components, as they collaborate or communicate with each other by exchanging data or events/signals.

To date, no one else in the software world has recognized, acknowledged, or acted upon the foundational truths presented in Appendix-A. In fact, these truths often provoke intense cognitive dissonance, profound discomfort, or even hostile resistance and ad hominem attacks, as they directly challenge deeply entrenched orthodoxies and dominant mental models rooted in illusory conceptual frameworks.