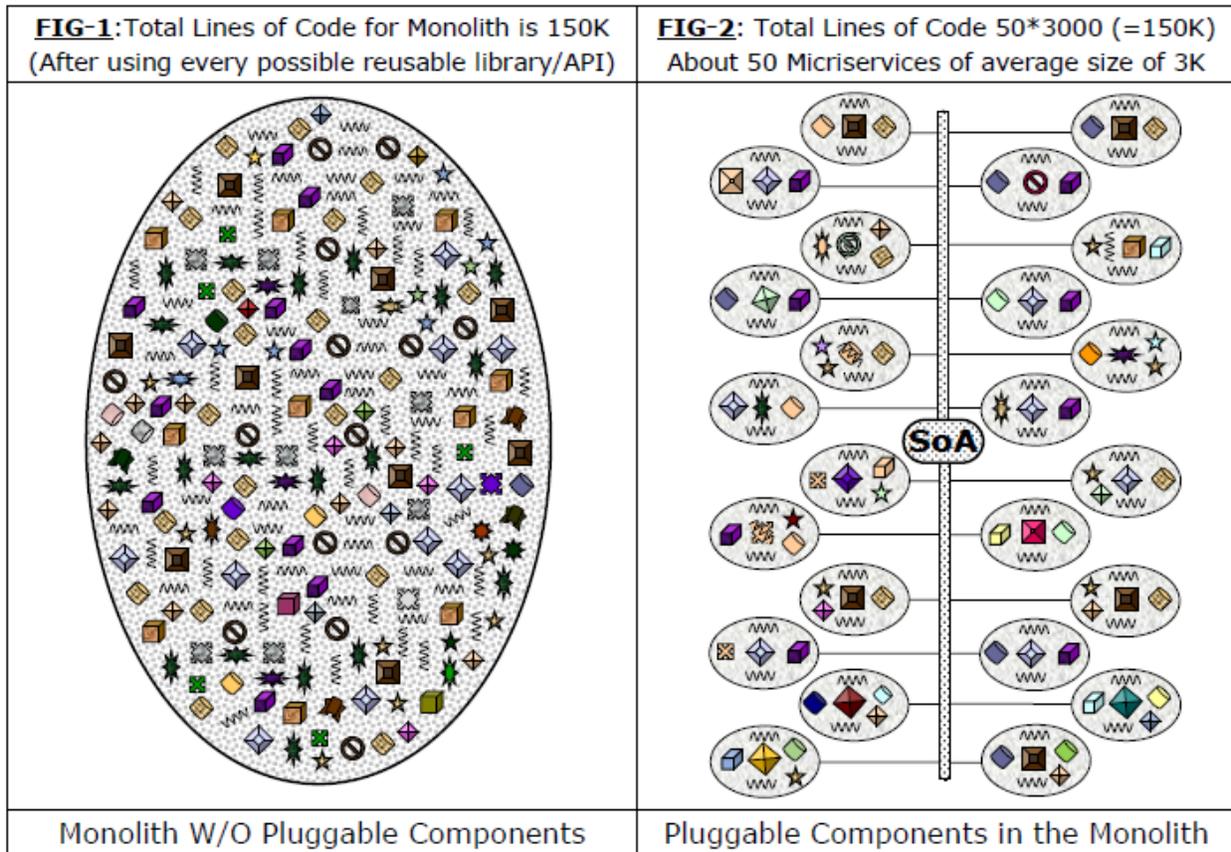


## **Profoundly Uncomfortable Truths: Scientific Hot Potatoes**

Profoundly uncomfortable truths (i.e., scientific hot potatoes everyone refuses to handle) have always spoken volumes. They spoke volumes when no one in the world knew the deeply uncomfortable hot potato truth—that the Sun, not the Earth, is at the center of the solar system. They spoke volumes when no one knew the hot potato truth—that germs, not bad air or imbalances, are the true cause of diseases.

Today, it speaks volumes once again that no one in the world knows the foundational truths about the objective reality of Component-Based Products (CBPs), the essential nature and characteristics of real components (that are essential to build each product as a CBP), and the indispensable methods and mechanisms of Component-Based Engineering (CBE). These deeply uncomfortable truths (see the Exhibit-A below) remain unacknowledged—not because they lack evidence, but because they challenge the comfort of entrenched axiomatic beliefs or dogma.

Today, no one in the software field fully understands the vital foundational truths (see Exhibit-A below) about objective reality—truths supported by verifiable evidence—concerning physical components and parts, including their intrinsic nature and essential properties; the anatomy, structure, and construction of physical or real Component-Based Products (CBPs); and the methods and mechanisms that underpin authentic CBE. One of the most profound challenges in overturning such a prevailing dominant pseudoscientific illusory paradigm lies in the problems such as incommensurability—the deep, structural incompatibility between the concepts, methodologies, descriptions, and evidentiary standards of the pseudoscientific paradigm and those of the hard scientific paradigm created to replace it.



At the foundation of any valid hard scientific discipline lies one or more foundational axiomatic principles or theories, commonly referred to as first principles. In any scientific field, it is a fatal mistake to ground these crucial first principles in flawed beliefs or myths—such as the notion that the Earth is at the center of the universe, or that bad air causes disease. Doing so inevitably leads the discipline into crisis, ultimately causing it to be evolved into a form of pseudoscience dogma—akin to the geocentric illusion that prevailed until the 16th century or the illusory miasma theory of disease that persisted until the mid-19th century.

The foundational truths or postulations outlined as an Exhibit below—referred to as first principles and foundational theories within Componentology—are indisputably correct and verifiable scientific observations. They hold true within the broader context of all other engineering disciplines that employ real CBE, including

mechanical, automotive, aerospace, computer, and electronic fields. These disciplines routinely design and construct large and complex products—such as cars, airplanes, jet fighters, and advanced supercomputers—by assembling real components, as illustrated in FIG-2.

Each of these disciplines can be utilized in the design and construction of large or complex products such as cars, airplanes, computers, spacecraft, electronic machines like telecom switches, medical equipment such as MRI machines, and other large machinery for factories, as a CBP (Component-based Product).

**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.

It is deeply regrettable that the scientific and research community appears determined to suppress or sabotage these indispensable insights, despite their fundamental importance in achieving an objective understanding of reality—an understanding that constitutes the essential theoretical foundation for meaningfully and effectively addressing the longstanding infamous software crisis.

It is inevitable that any scientific discipline will eventually descend into crisis if its foundations or first principles are fundamentally flawed. When this occurs, valid scientific evidence that challenges the prevailing myths is often treated as a “hot potato”—avoided rather than engaged with, no matter how verifiable or reproducible it may be: <http://componentology.org/Ref/ModifiedKuhnBlackHolePhase.pdf>

Tragically, the research community has always chosen the comfort of illusion over the profound discomfort of objective reality. History offers no shortage of examples. For centuries, the geocentric model was defended not because it aligned with evidence, but because it preserved the illusion of cosmic centrality and theological convenience. Likewise, the miasma theory of disease endured far longer

than it should have, shielding generations of medical authorities from confronting the invisible but undeniable truth of germs.

These grand illusions crumbled only when brave individuals—willing to endure ridicule, humiliation, persecution, and ostracization by sacrificing their own dignity and self-respect—confronted anti-scientific zealots with new instruments, deeper insights, and compelling empirical evidence, ultimately exposing those illusions to the light of reason, illuminated and reinforced by the clarity of indisputable verifiable empirical evidence for the objective reality.

**Summary:** Although it is possible to design and build every large and complex software as an ideal CBP as illustrated in FIG-2, today no large software product is designed and built as illustrated in FIG-2. Designing and building large and complex software as an ideal CBP (i.e., by plugging-in optimal sized real components as illustrated in FIG-2) can increase productivity, quality, sustainability, and agility essential for increasing the rate of innovation by at least 5 to 10 folds.

Historically, the most controversial and disruptive scientific challenges have emerged from valid, verifiable, and reproducible evidence that directly confronts widely practiced and deeply entrenched paradigms or orthodoxies. Often, such iconoclastic evidence is discovered serendipitously—while working on unrelated issues or something else—and its implications prove so radically transformative that they unsettle the foundational assumptions of entire disciplines.

This type of evidence becomes a proverbial “hot potato”—so profoundly uncomfortable that few dare to engage with it, even when avoidance constitutes a clear breach of moral, ethical, and scientific integrity. The discomfort arises not from

any deficiency in the evidence itself, but from the existential threat it poses to the deeply entrenched prevailing consensus, climate of opinions or reputational capital.

Institutions and individuals alike often choose to ignore or dismiss these paradigm-challenging truths—not because the evidence lacks merit, but because its implications threaten the prevailing consensus, professional reputations, institutional legitimacy, and egos of entrenched powers. In the absence of a binding legal obligation, such evidence is rarely evaluated on its scientific merits.

For example, the National Science Foundation (NSF.gov) has repeatedly refused to engage with verifiable and reproducible evidence exposing fatal flaws in the prevailing software engineering paradigm—despite its statutory mandate under the National Science Board’s *Potentially Transformative Research (PTR) Policy* and Public Law 110-161 (Appropriations Act of 2008) to evaluate such iconoclastic evidence through a qualified, merit-based peer review process. This process, by law and design, requires properly trained subject-matter experts capable of understanding the incommensurable nature of paradigm-shifting discoveries.

Rather than fulfilling its legal and ethical obligations, the NSF has resorted to ridicules, derision, ad hominem attacks, and retaliatory measures against those exercising their First Amendment right to petition the government for redress. Such conduct not only violates the letter and spirit of congressional mandates; but also reflects a broader historical pattern in which institutions treat paradigm-disrupting truths not as opportunities for progress, but as threats to be suppressed.

Having exhausted all other options, we were left with no choice but to pursue legal action against NSF.gov. Only under the force of law are institutions and

individuals ultimately compelled to confront evidence capable of triggering a paradigm shift—evidence that challenges dominant pseudoscientific illusory frameworks which have persisted for decades or even centuries, and which are upheld by millions, or even tens of millions. For example, the prevailing pseudoscientific paradigm in software engineering is sustained by tens of millions of active practitioners worldwide—professionals who have been systematically indoctrinated into a deeply flawed and misleading dogma.

The truth that the Sun is at the center of the solar system was a “hot potato” when it was first proposed—so disruptive to the prevailing worldview that it was met with fierce denial and persecution. The truth that germs, not miasma, cause disease was likewise a “hot potato,” resisted for decades by entrenched medical authorities. Similarly, the above *Exhibit-A: Foundational truths to understand the objective reality* summarizes a reality that exposes fatal flaws in the prevailing software engineering paradigm—is today’s “hot potato”. The objective reality represented by hard science Componentology is so profoundly uncomfortable that no institution or authority wishes to acknowledge or engage with it. Like the truths before it, it is avoided not because it lacks evidence, but because its acceptance would necessitate the unraveling of a dominant yet deeply flawed orthodoxy.

**Note on Terminology:** The word *discomfortable*—though archaic or rarely used in modern English—is intentionally chosen over *uncomfortable* to emphasize a deeper, more visceral disruption of cognitive or intellectual ease. These truths are not merely uncomfortable; they are incommensurable and profoundly disorienting to the prevailing scientific orthodoxy—rendering them, quite literally, “*discomfortable scientific hot potatoes*”: <http://componentology.org/Briefs/TheGreatestHonour.pdf>

## **The Two Most Discomforting and Heretical Truths in Software Engineering:**

There exist two incontrovertible yet profoundly hated and deeply discomforting truths that expose the foundational crisis in software engineering:

1. Every large software product developed today is still built as a monolithic structure—as depicted in *FIG-1*. Although such systems may incorporate object instances or modules (that cannot be assembled and disassembled literally), they do not constitute true *Component-Based Products (CBPs)*—despite decades of claims surrounding Component-Based Software Engineering (CBSE).
2. Although every software product *can* be built as a true CBP, today not a single large-scale software product *is* built as a true CBP—as illustrated in *FIG-2*—by plugging in multiple real, replaceable, and independently developed, optimally sized software components (where each can be plugged-in and unplugged in minutes). This approach mirrors the mature engineering practices of other disciplines such as automotive, aerospace, and electronics.

These are not matters of opinion, but objective and verifiable observations grounded in empirical reality (see Exhibit-A above). Yet, they are often treated as scientific heresies by the mainstream software research community. When I respectfully ask experts or researchers who disagree with either of these assertions to provide even a single counterexample—a real-world software product demonstrably built as a true CBP—they consistently respond not with evidence, but with ridicule, ad hominem attacks, or evasive insinuations/rhetoric.

Such defensiveness only underscores the fragility of the prevailing paradigm, and the institutional discomfort with confronting scientific truths (i.e., the objective reality in Exhibit-A) that challenge entrenched orthodoxy. The unwillingness to engage with these truths—let alone investigate them on their merits—reveals the magnitude of the crisis and the urgent need for paradigm correction.