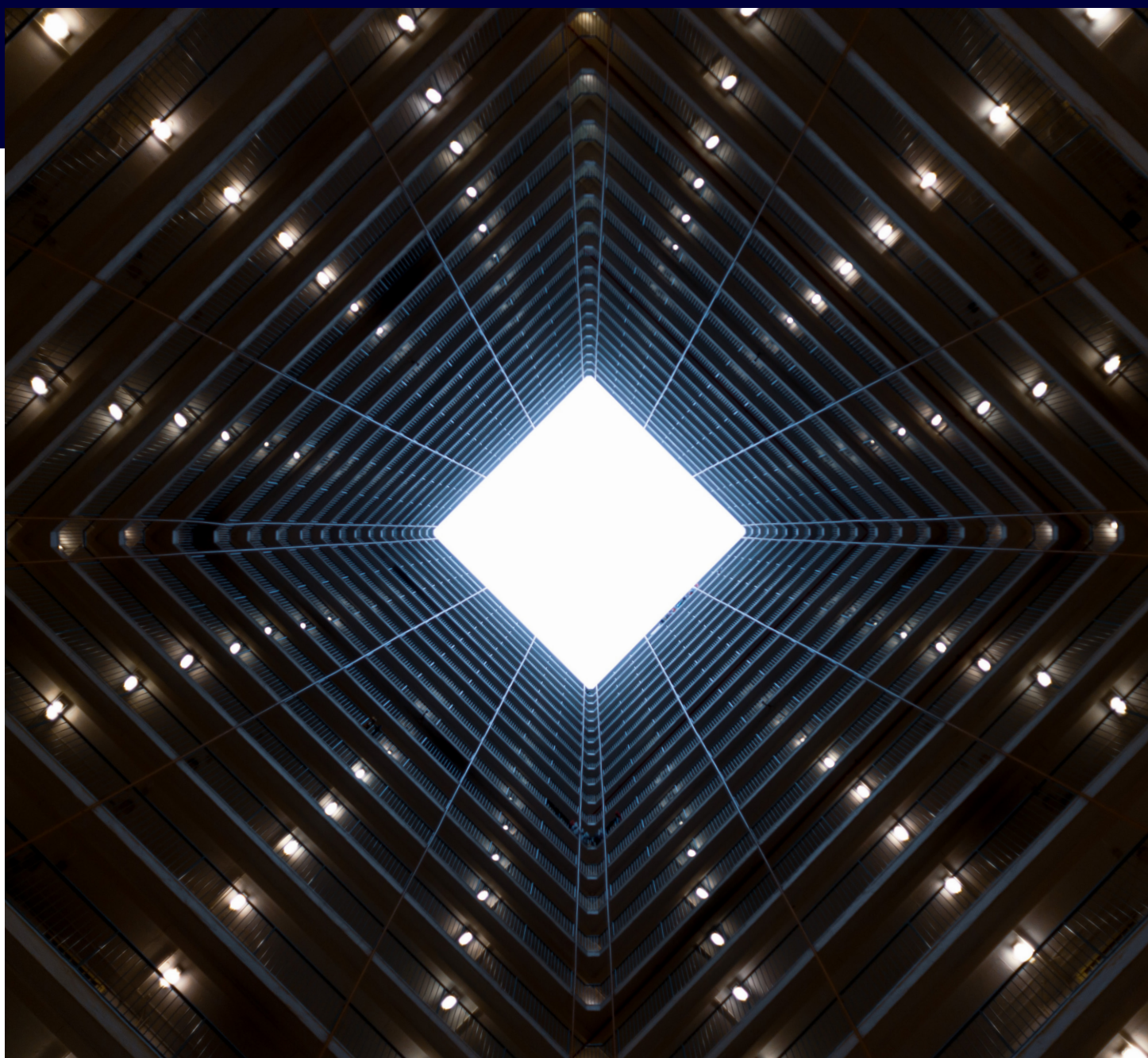
Persistent

Legacy Lives On:
An Insights-driven approach to Modernizing Legacy Products

ExtenSURE — A framework for Intelligent Product Sustenance Engineering in the Digital Age



Old systems don't easily solve new problems. Yet, today we see hundreds of thousands of customers using an extensive portfolio of legacy products while expecting new-age user experiences and a steady improvement in scalability, security, and reliability.

Persistent's ExtenSURE, a first of its kind framework in the software industry, leverages our Software 4.0 methodology in addressing the age-old problem of product sustenance. It takes a data-driven approach to product transition and transformation, giving software companies, actionable insights they require to extend the life of their legacy products.

Our 30 years of leadership in software product engineering and an excellent track record of working with the world's leading software product companies allows us to leverage Software 4.0 — our signature execution methodology, that combines the power of design thinking, hackathons, continuous engineering, and agile to build next-generation software products.

Legacy Products can Burden Your Bottom Line

They drain expensive resources & become an unnecessary distraction for engineering teams.

They require companies to shift focus away from innovation
With an increasingly unsustainable amount of resources allocated to legacy product maintenance and customer support, it is hard for software companies to keep their focus on innovation and stay competitive.

There are a lot of redundancies and overlap brought on by M&A
Extensive M&A activity by software companies often leaves them with redundant product lines and variants of products that do essentially the same thing.

Maintaining the brand experience becomes challenging
Long-term customers of legacy products expect continued support and upgrades. A poorly-executed sustenance strategy can be detrimental to a carefully-cultivated brand experience.

Catering to a niche customer base comes with its own set of restrictions and expectations
Functionally, certain products are intended to support only a few niche customers, with no up-versioning, upgrading, or refreshing requirement. These products quickly become a nightmare for the product engineering team.

Dusty technology stacks, outdated UX
Once leading-edge, technology stacks quickly become obsolete and non-compliant. Outdated UX, together with feature sets that are non-compliant with government regulations, make obsolescence inevitable for these stacks. Another factor that makes them increasingly difficult to maintain is the growing scarcity of skilled resources in the market.

Fitting In

Supporting product lines that don't fit into a company's strategic plans or with declining revenues lead to low-profit margins and drag on valuation.

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Legacy Products have Untapped Value

There is tremendous potential to delight loyal customers while extending revenue pipelines and improving the bottom line.

There is a wide variety of new-age technology options to augment legacy products
From chatbot-driven customer support to AI/ML-based operations, several options can help improve user experience and stickiness while reducing spends on legacy products.

A portfolio of legacy products comes with an enviable set of loyal customers
A ready base of customers can dovetail into newer product lines and fuel growth for software businesses.

AI/ML-based tools to improve product performance
Leveraging new-age AI/ML-based tools to identify code hotspots, churn, and complexity can improve overall product robustness and cut sustenance team efforts by half.

Lengthening the Legacy

With the right infusions of technology, legacy products can surpass their expected lifespan and continue to be profitable.

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ExtenSURE — Intelligent Product Sustenance Engineering in the Digital Age

Unlock hidden value from your aging legacy products.

Product Transition

Codebase Analysis
\ Code Hotspots
\ Team Dynamics
\ Dependencies

Codebase Transfer
\ Design and Architecture
\ Workflows and Integrations
\ Processes and Governance

KM & Support Communities
\ Documentation
\ KM Platform
\ Communities of Support

Product Transformation

Chatbots
Customer Support

Artificial Intelligence
Sustenance Operations

Automatic Defect Triaging
Rapid Debugging

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Product Transition made Seamless by ExtenSURE

In-depth analysis and actionable insights for effective transitioning.

ExtenSURE framework begins with an in-depth analysis of the codebase using automated product analysis and observability tools.

The analysis covers application architecture, static code and data analysis, code coverage, code complexity, log analysis, documentation, bugs, and security vulnerabilities. Based on this analysis, key vectors such as complexity and churn scores can be calculated for various code modules of the product codebase. These vectors help generate actionable insights to plan and prioritize activities for transitioning the product codebase effectively.

Code complexity and hotspots

- Assesses current technical debt to initiate transition planning.
- Identifies and prioritizes critical hotspots in code, based on previously deployed fixes.
- Identifies and prioritizes complex modules for transition planning.

Code contributors and team dynamics

- Identifies top code contributors to help decide on a transition or replacement plan.
- Helps understand team dynamics and dependencies for a smooth transition phase.
- Accurately measures flight risk by combining knowledge risk view analysis with an individual knowledge map.

Code structure and dependencies

- Helps identify dependencies across various modules to understand the structure of the product codebase and reverse engineer architecture and design.
- Automatically generates technical documentation for unknown/non-documented databases.
- Extracts business rules from application codebase to understand and document functionality.

Why ExtenSURE's codebase analysis phase is a crucial first step

It helps reduce dependence on engineering resources from the client-side and handling hostile, uncooperative incumbent members of the engineering team. It also helps prioritize and focus on crucial code modules to ensure the engineering team does not just fix superficial bugs but looks deeper into the issues and tackles them at the root.

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The codebase transfer then starts by building a team aligned with the client's vision and engineering roadmap for the product.

This crucial step sets the tone for a smooth kick-off for product sustenance operations.

Coverage

Product Roadmap	Architecture	Design	Features
Workflows	Integrations	Technology Stack	Engineering Processes
Team Organization	Training	Communication	Program Management
Modules and Sub-Systems		Governance Structures	

ExtenSURE builds knowledge management and support communities to give support and sustenance engineers the right information on time.

Critical insights, ideas, and knowledge that teams gain through their experience of the product portfolio are often difficult to access without the right set of tools and practices.

ExtenSURE's transition phase places great emphasis on building an extensive repository of tacit and explicit product knowledge in the form of enterprise knowledge management systems for the product portfolio.

A robust knowledge building phase coupled with strong knowledge management (KM) platforms enables support and sustenance engineers to find the right information at the right time, allows them to reduce risks, minimize resource dependencies and expedite team transitions.

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Data-Driven Technology Transformation

Leveraging AI, ML, and analytics to meet today's user expectations.

Context-aware chatbots significantly improve customer support experience

Persistent's context-aware chatbots within ExtenSURE automatically respond to customer queries and grievances and manage automated case-creation and workflows by seamlessly integrating with ticket management and support systems.

Our self-service chatbots leverage rich product information within knowledge management systems and historical data from support tickets for training their models. They use this data for effective conversation management, including customer identification, product deployment and usage details, past ticket history, and issue isolation and diagnosis. They support faster decision-making by service agents by navigating efficiently through cluster hierarchy and setting business rules to arrive at appropriate ticket resolution quickly.

These chatbots can be further enhanced by integrating with social media channels, voice assistants, and local language libraries to provide a seamless support experience.

Automated defect triaging to resolve customer support requests rapidly

Auto ticket triaging uses neural network models to learn syntactic and semantic features of ticket metadata to intelligently identifies owners for ticket assignments. It also reduces the developer's time debugging and fixing an issue, using auto issue classification into categories and offering hints on feature or code areas that could be causing it.

Artificial Intelligence automates product operations and eliminates downtimes using predictive analytics

AIOps can identify potential problem events before they occur, enabling IT teams to take preventive measures. It assimilates operations data from various tools, devices, services, and scours through the data to identify 'patterns' for significant events intelligently. It automates RCA and supports actionable reporting for rapid response and resolution. ML models predict root causes, provide suggestions for possible fixes, and auto-assign tickets intelligently.

It automates QA cycles and left-shifts possible issues before they reach production by analyzing issue fixes at the QA stage and predicting any regression. It also generates knowledge bases and improves knowledge management by auto-publishing issues, fixes, and related metadata for future reference.

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Driving Client Success

How ExtenSURE helped clients achieve greater efficiency by reducing technical debt and improving codebase health.

Taking over a platform for fully managed hybrid cloud infrastructure from a leading enterprise technology company.

Designed for enterprise customers, this platform **supports a wide range of applications with diverse workloads**. From legacy products to modern bigdata, analytics, IoT and microservices applications — the platform offered **shortest time to value, low total cost of ownership** and a **unique utility based pricing model**. Taking over this 10-year old platform with 1.2+ million lines of code with a diverse tech stack of Java, Python, C#, JavaScript, CSS/HTML, SQL and XML was a challenge. The client's 20-person team had **system mastery over only 8%** of the **codebase**, with remaining code having been contributed by nearly 360+ ex-developers over the history of the product.

The automatic code review within the ExtenSURE framework identified **8.2%** of the codebase as hotspots and **7** key architectural components that had significantly increased in cyclomatic and cognitive complexity over the previous 4 years — resulting in decline of the overall code health score of the product to 2/10. It also identified critical dependencies within the team and laid out the plan for systematic knowledge transition and knowledge management interventions for improving the codebase mastery within the team.

Owing to the analysis and subsequent interventions, the **platform's technical debt** was **reduced** by nearly **70%** over the next 3 quarters with feature development going hand-in-hand with fixes to **improve maintainability**, **reliability, stability**, and **security** of the codebase. This resulted in **improvement** in **product CSAT** and **reduction in sustenance costs** by nearly **37%** over the next 3 – 4 quarters.

Addressing technical debt and code health for a global media research and insights provider

Persistent deployed the ExtenSURE framework to address technical debt, code health, hotspots, behavioral code, and team dynamics over **37** repositories consisting of **43 million** lines of code in **67,000** files contributed by **140** engineers over **15** years, of which more than **50** were active at the time.

The analysis revealed that:

\ **8** of the code repositories, including one of the recently rejuvenated product lines, were in poor health
\ **10** repositories had critical dependencies and heavy knowledge loss due to recent attrition
\ **40%** of the team was poorly loaded, assigned to products that needed very little support activity

The detailed insights allowed the engineering team to devise a knowledge management strategy to mitigate attrition problems with the core team and reduce risk and dependencies on critical resources while saving **15%** to **20%** by optimizing the product support team.

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Why Persistent

Product Engineering DNA

A 30-year legacy of leadership in software product engineering and digital transformation.

Partners in Innovation

Excellent track record with clients and innovation partner of choice for the world's leading software product companies.

Robust execution framework

Leveraging Software 4.0, our signature methodology that combines the power of Design Thinking, Hackathons, Agile, DevOps, CI/CD & industry solution accelerators to build next-generation digital products with breakthrough operational efficiency.

Expanding Partner Ecosystem

Connectors, integrations and accelerators built on or built with leading platform partners such as AWS, Google Cloud, IBM, Mambu, Outsystems, Microsoft, RedHat and Salesforce.

About Persistent

Persistent Systems (BSE & NSE: PERSISTENT) builds software that drives our customers' business; enterprises and software product companies with software at the core of their digital transformation.

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