Enhancing
Quality and Efficiency
in Payments Testing:

SOLAR TESTING TOOLKIT SERVICES

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December 12, 2025

This white paper outlines a practical approach to establishing a mature, automated testing capability for payment-processing systems. It is based on hands-on experience with banks, processors and fintechs operating complex, multi-channel payment landscapes.

1 EXECUTIVE SUMMARY

Testing practices in the payments industry show no clear, consistent trends. Each organisation follows its own approach, often shaped by legacy systems, fragmented architectures, and historical QA practices. As a result, testing environments vary widely in maturity, tooling, repeatability and automation. What is consistent across the market, however, is the need for faster delivery cycles, higher reliability, and reduced operational cost.

The range of available tools does little to resolve these challenges. Free general-purpose utilities such as Postman simplify API testing, but they do not support industry-critical transport formats like ISO 8583 or ISO 20022, nor do they offer cryptographic validation or realistic end-to-end message flows. Payment-scheme simulators are expensive, difficult to automate, and frequently diverge from production behaviour, limiting their value for continuous regression or integration testing. Online certification services tend to focus on a narrow set of scenarios and cannot act as a comprehensive, reusable testing framework for a full transaction-processing stack.

Many organisations attempt to fill these gaps by building their own internal testing tools. While these efforts are understandable, they rarely evolve into robust, scalable solutions. Homegrown tools often lack maturity, offer limited automation, provide only basic support for multiple QA teams and test environments, and typically suffer from usability issues that slow down adoption and parallel workstreams.

SOLAR Testing Toolkit (STT) addresses these barriers directly. It provides a unified, flexible test automation platform purpose-built for payments, supporting the full lifecycle of functional, regression, and performance testing. STT is available both as an on-premises solution and as a managed service operated by Solanteq. Combined with our professional services — including test-plan development, scenario engineering, responder configuration, and performance-testing support — STT enables organisations to significantly accelerate delivery, reduce testing effort, improve quality, and achieve predictable, repeatable compliance with industry and scheme requirements.

2 MARKET CONTEXT: WHY PAYMENTS TESTING REMAINS DIFFICULT

Payments technology continues to grow in complexity, yet the industry lacks standardised, efficient approaches to testing. Regulatory expectations, scheme-mandated certification cycles, and the proliferation of delivery channels place sustained pressure on both development and QA teams. Issuers, acquirers, processors and fintechs all face the same challenge: ensuring predictable, high-quality releases within increasingly compressed timelines.

Testing is inherently difficult because payments infrastructure is heterogeneous. A single transaction path may involve multiple independent systems — payment schemes connections, host authorisation engines, HSMs, ATM and POS device handlers, e-commerce front ends, core banking platforms, mobile applications, and various integration layers. Any realistic test must orchestrate these components coherently, often across several environments. This makes manual testing slow, fragile, and prone to omissions.

Regulatory and scheme-driven requirements further raise the bar. International payment schemes provide narrow testing windows, and certification projects are expensive to repeat. Even small defects discovered late can trigger significant delays or re-certification, stretching project budgets and exposing institutions to operational and reputational risk.

Manual regression testing is particularly resource-intensive. In organisations with well-defined QA processes, a full regression cycle typically requires two to three weeks of dedicated effort. This is not due to inefficiency, but to the sheer volume of scenarios, channels, formats, and edge cases that must be validated to maintain confidence in production readiness. The increasing frequency of releases driven by agile delivery makes this approach difficult to sustain.

Against this backdrop, the industry's limitations in tooling become more apparent.

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SOLAR Testing Toolkit is a specialised automation platform designed for the full testing lifecycle of card- and payment-processing systems. Unlike generic QA tools or narrow certification utilities, STT provides an end-to-end framework capable of modelling real transaction flows across all major industry interfaces. It is built to support issuers, acquirers, processors, payment facilitators and fintech platforms operating in complex, multi-channel environments.

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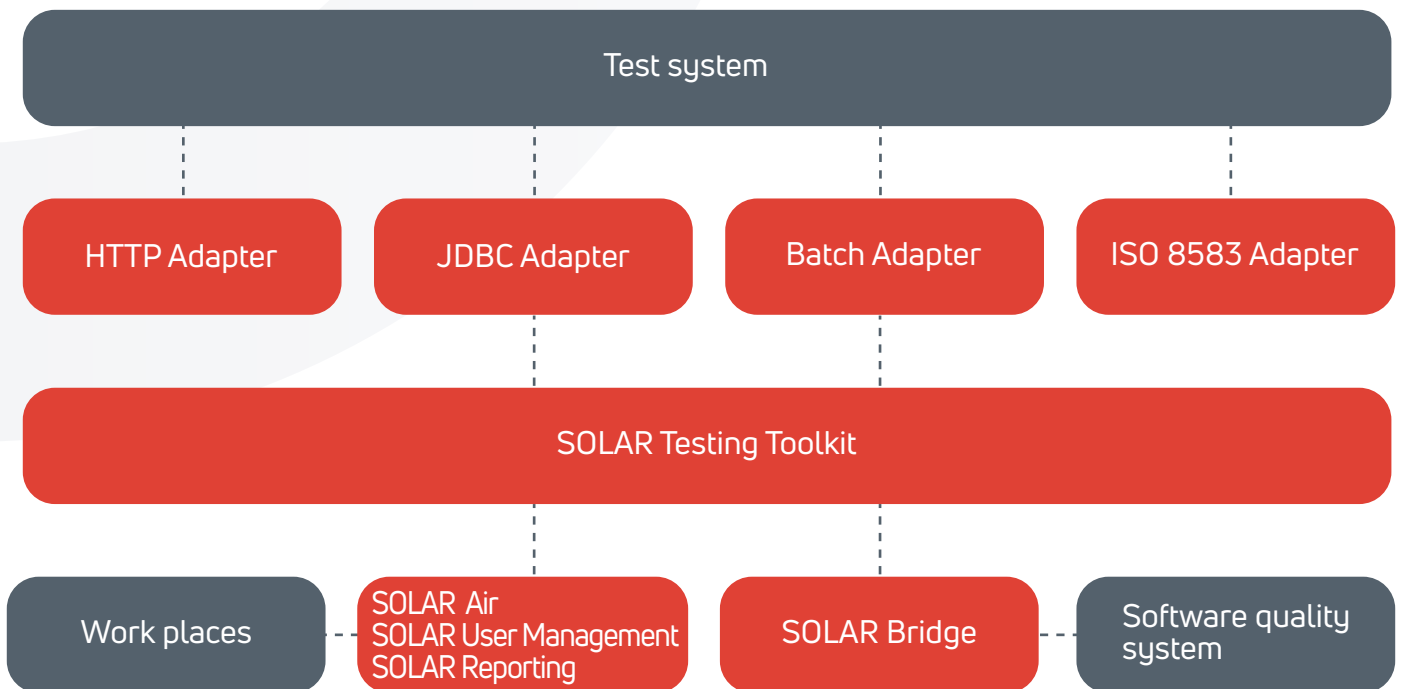
Figure 1: SOLAR Testing Toolkit modules overview

At its core, STT enables organisations to automate functional, regression and performance testing using industry-standard formats and protocols. The platform natively supports ISO 8583, ISO 20022, scheme-specific interfaces and a broad range of device and channel emulations, including ATMs (DDC/NDC/Nexo), POS terminals, e-commerce gateways and API-based integrations. It performs full cryptographic validation, including ARQC/ARPC, PIN block handling and MAC calculation, ensuring that test scenarios reflect production behaviour as closely as possible.

Test creation in STT is based on configurable templates and reusable scenario components. No programming skills are required: business analysts and QA specialists can construct scenarios through a structured web interface, manage test data, parameterise message fields, build conditional logic and orchestrate multi-step flows. Each execution produces detailed, step-bystep reporting with full message traces and comparison against expected values.

The platform also provides a responder mode, allowing teams to emulate external systems such as IPS hosts or third-party processors. This is particularly useful for early integration and continuous regression, where production scheme simulators may be unavailable, costly, or unsuitable for automated pipelines.
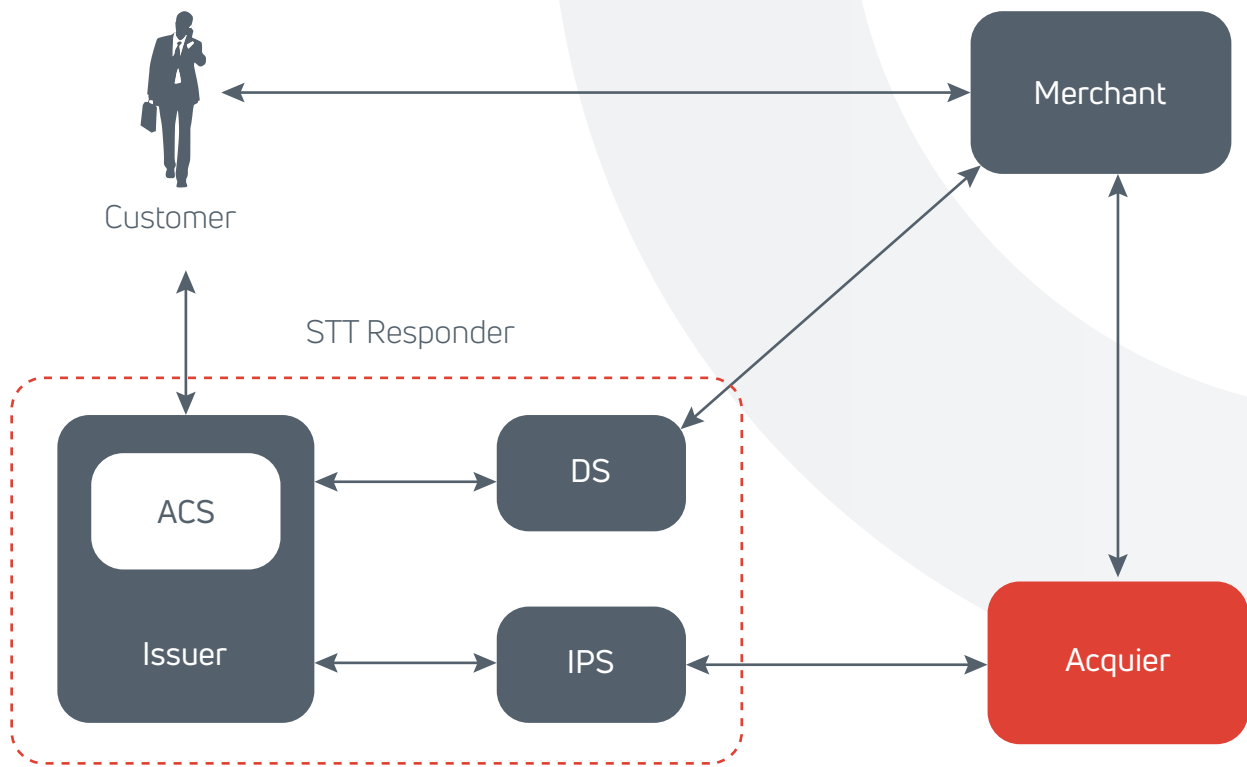
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Figure 2: Test environment with STT Responder

STT can be deployed on-premises or operated as a managed service. In both models, it is designed for horizontal scalability, supporting multiple teams, parallel environments and highvolume performance testing. For organisations seeking predictable release cycles and repeatable validation processes, STT offers a unified environment that consolidates testing activities and reduces time-to-market across the entire payments technology stack.

SOLAR Testing Toolkit (STT) is more than a standalone product. It forms a complete testing ecosystem supported by professional services that help organisations establish consistent, automated and repeatable QA processes across their payments landscape. While STT provides the technical foundation — multi-protocol support, realistic emulation, regression automation and performance testing — our services ensure that customers can adopt these capabilities efficiently and use them to their full potential.

Solanteq's service portfolio is built around four complementary pillars:

- STT as a Managed Service (SaaS): a fully operated environment delivered and maintained by a qualified team, removing the need for customers to manage infrastructure, updates or operational support.
- Test Planning and Scenario Engineering: expert support to define test strategies, prepare test lans, develop functional and regression scenarios, and establish consistent automated campaigns tailored to each organisation's product landscape.
- Responder Configuration and System Emulation: deployment of rule-based emulation for payment scheme connections and external hosts, enabling realistic, cost-effective testing without reliance on scheme simulators.
- Performance and Load Testing Services: development of load profiles, execution of controlled performance campaigns, and analysis of throughput, latency and system behaviour under realistic high-volume conditions.
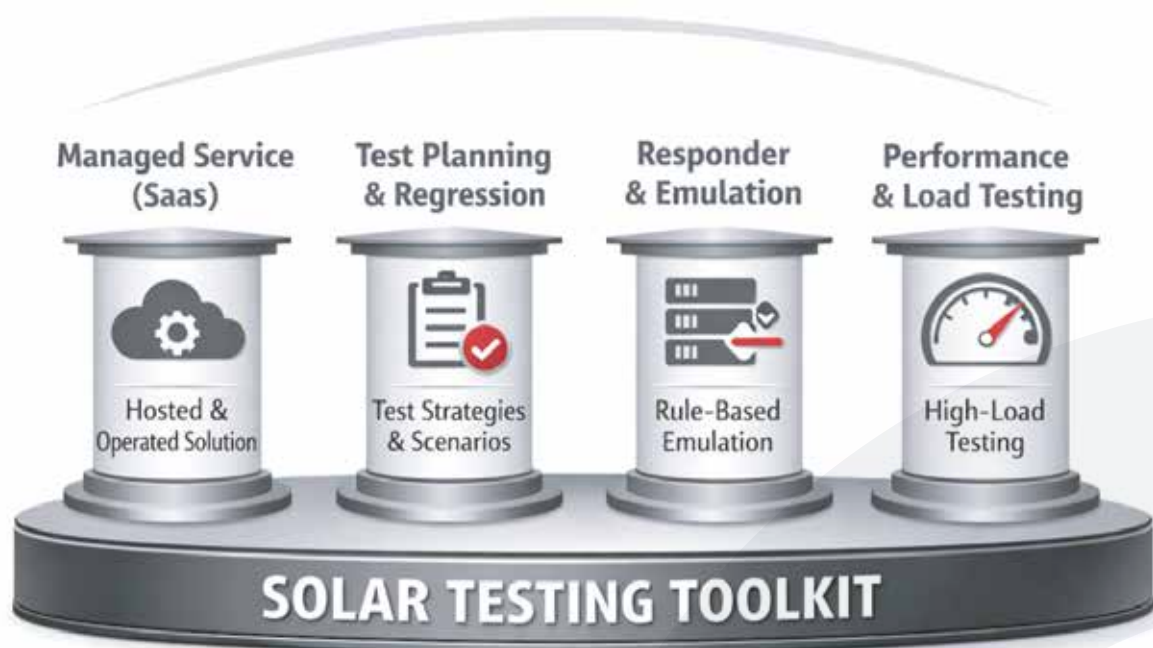

Figure 3: Four STT service pillars

Together, these pillars transform STT from a testing tool into a structured, scalable and maintainable testing capability — one that supports rapid delivery, predictable quality and comprehensive coverage across all stages of system development and operation.

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4.1 SERVICE PILLAR 1 — TESTING TOOLKIT AS A MANAGED SERVICE (SAAS)

For organisations seeking rapid adoption of advanced testing capabilities, SOLAR Testing Toolkit is available as a fully managed service. In this model, an experienced operations team deploys,monitors and maintains the entire fully independent and self-contained STT environment,enabling customers to focus solely on test design and validation activities.

Each customer receives two instances — a test environment and a dedicated "production" environment for stable, repeatable execution of automated test scenarios. Instances provide complete isolation of data and configuration.

The managed service removes the need to provision hardware, maintain DevOps pipelines or manage upgrades.

Under this model, responsibilities are clearly defined. The operations team provides:

- System monitoring and availability management: continuous health checks, resource oversight and proactive incident prevention.
- Initial configuration of test projects: preparation of core structures, environments, access roles and baseline scenarios.
- Operational maintenance: routine housekeeping, log management, performance tuning and environment stabilisation.
- Mandatory platform updates: timely rollout of new versions, security patches and enhancements.
- Configuration of new channels, templates or scenarios (upon request): extending the environment to support additional protocols, message formats or business flows.

By combining dedicated infrastructure, predictable operational support and seamless scalability,

the managed service offering enables organisations to deploy STT quickly and run it reliably as part of a continuous, long-term QA strategy.

4.2 SERVICE PILLAR 2 — TEST PLANNING, SCENARIO DESIGN, AND REGRESSION CAMPAIGNS

Effective testing in payments requires more than a technical platform: it demands a structured test strategy, consistent scenario design and repeatable execution cycles. SOLAR Testing Toolkit is supported by a team of subject-matter experts and test engineers who help customers establish a disciplined, automation-ready QA process aligned with their issuing, acquiring, switching or scheme-specific requirements.

Our experts work jointly with customer teams to prepare comprehensive test plans tailored to each organisation's product portfolio and integration landscape. Where a customer already maintains internal documentation, we can perform a detailed review of the existing test plan, identify coverage gaps and refine the scope.

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Scenario development is supported at multiple levels. We design and configure the necessary templates, build baseline "happy-path" scenarios and create the full suite of functional and regression tests according to the agreed plan. Where customers already have existing scenarios, we perform structured reviews to validate correctness, completeness and consistency.

To support continuous delivery, our team can configure regular execution cycles — weekly, monthly or tied to release milestones. This includes orchestration of automated test runs, consolidation of results and distribution of detailed reports to the relevant stakeholders. Predefined scenario packs and reusable templates accelerate the onboarding process and he lp customers achieve stable automation quickly.

Throughout the engagement, our specialists provide guidance and support at every stage: from early planning and initial setup to long-term optimisation of regression campaigns. This ensures that testing becomes a predictable, repeatable and well-governed part of the organisation's delivery lifecycle.

4.3   SERVICE PILLAR 3 — RESPONDER CONFIGURATION AND IPS/HOST EMULATION

In addition to scenario-based test execution, SOLAR Testing Toolkit provides a responder mode designed for continuous, autonomous emulation of external systems. Unlike on-demand test runs that require explicit user initiation, the responder operates passively and responds automatically to incoming requests in real time, without manual intervention. This makes it particularly well suited for integration testing, system stabilisation and ongoing regression activities.

Responder configurations are commonly used by acquirers and processors during the development and validation of their IT systems. By emulating the behaviour of external counterparts, teams can test end-to-end transaction flows without dependency on live payment schemes or third-party simulators. Within STT, responders emulate payment scheme behaviour across multiple interaction layers. This includes real-time online authorisation responses, generation and processing of clearing files, and support for dispute and chargeback cycles. Cryptographic validation and response generation are handled automatically, ensuring that message content, security elements and state transitions closely reflect production conditions.

The responder engine is rule-based. Users can define an unlimited number of response rules, each with matching conditions on incoming messages and fine-grained control over response content. This allows teams to simulate a wide range of outcomes — from straightforward approvals to declines, reversals, timeouts and error scenarios — within a single, consistent framework.

Our experts assist customers in designing, configuring and validating responder rules aligned with their integration objectives. Our team can provide an initial set of rules, as well. This enables organisations to replace costly, rigid simulators with a flexible, automated emulation layer that supports both early-stage development and long-term operational testing.

4.4   SERVICE PILLAR 4 — PERFORMANCE AND LOAD TESTING AS A SERVICE

Performance and load testing are critical for payment systems operating under strict availability, latency and throughput requirements. SOLAR Testing Toolkit supports high-volume testing with real transaction formats and cryptographic processing, allowing organisations to assess system behaviour under conditions that closely resemble production workloads.

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Our team assists customers in designing and configuring load profiles tailored to their specific architecture, traffic patterns and business expectations. This includes defining transaction mixes, peak and off-peak distributions, concurrency levels, message sequencing and failure scenarios.
Load profiles can be aligned with scheme requirements, internal capacity targets or planned business growth.

We support both one-off performance testing sessions — for example, ahead of major releases or nfrastructure changes — and regular, repeatable load testing as part of an ongoing quality assurance strategy. Test execution is coordinated with customer teams, with controlled ramp-up, monitoring and post-test analysis.

Following each campaign, detailed results are reviewed to identify bottlenecks, stability risks and performance degradation under load. Where required, our team provides guidance on tuning, optimisation and follow-up testing to validate improvements.
By combining realistic traffic modelling, automated execution and expert support, performance testing with STT enables organisations to validate scalability, reduce operational risk and maintain confidence in system behaviour under peak conditions.

5 DELIVERY MODEL AND ENGAGEMENT APPROACH

Engagements around SOLAR Testing Toolkit are delivered through a structured, collabortive model designed to minimise risk and establish a sustainable testing capability. While the exact scope and timeline depend on the customer's system landscape and objectives, our experience shows that a realistic setup phase is essential for long-term success.

A typical project begins with a discovery and scoping phase, during which testing objectives, system boundaries, supported channels and integration points are defined. This is followed by preparation and delivery of the STT configuration. In practice, the setup of core configurations, templates and representative example scenarios typically requires two to three months. This timeframe reflects the complexity of payment landscapes and allows sufficient depth to build reusable, production-grade test assets rather than ad-hoc scripts.

Once the foundation is in place, test scenarios and responder rules are extended iteratively in close cooperation with customer teams. Regression packs, load profiles and reporting structures are refined alongside active system development, ensuring that testing evolves in step with product changes.
Responsibilities are clearly defined. Solanteq's team provides platform expertise, configuration support and methodological guidance, while customer teams retain control over business rules, acceptance criteria and release decisions. Regular checkpoints, reviews and knowledge transfer ensure transparency and enable customer teams to operate STT independently where desired.

This delivery approach balances speed with robustness. By investing upfront in a wellstructured configuration and example set, organisations gain a stable testing framework that can be reused across releases, environments and projects, reducing effort and risk over time.

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6 SUMMARY

Testing in the payments domain is inherently complex, resource-intensive and costly. Fragmented tooling, manual regression cycles and reliance on external simulators slow down delivery and increase operational risk. As systems evolve and release frequency grows, these challenges become structural rather than temporary.

SOLAR Testing Toolkit, combined with professional services, addresses these constraints by providing a unified, payments-specific testing capability. Organisations gain a repeatable framework for functional, regression and performance testing, aligned with real transaction flows, industry protocols and scheme requirements. Automated execution, realistic emulation and structured reporting reduce dependency on manual effort and external testing windows.

The business impact is tangible. Customers shorten release cycles, improve test coverage and reduce the cost of certification and integration projects. Dedicated environments, responderbased emulation and managed operations enable teams to work in parallel and test continuously, without waiting for third parties or shared simulators.

By investing in a mature testing ecosystem rather than isolated tools, organisations establish a long-term quality foundation. This supports predictable delivery, operational stability and confidence in system behaviour — not only during certification or major releases, but as a standard part of day-to-day operations.

To explore how STT can be applied to your specific landscape — whether for issuing, acquiring, switching or scheme integration — we invite you to engage with our team for a tailored discussion or live demonstration. Together, we can assess your testing objectives, identify opportunities for automation and define an approach aligned with your delivery and compliance goals.

For further information or to arrange an initial consultation, please contact us via info@solanteq.com or visit www.solanteq.com.

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