HCLSoftware

Quality.
Delivered.

HCL OneTest provides UI, API, and performance testing, as well as, service virtualization and synthetic data fabrication to support testers throughout a project lifecycle. It features a script-less, wizard-driven test authoring environment and support for more than 100 technologies and protocols.

HCL OneTest belongs to the Secure DevOps product domain of HCL Software which is a division of HCL Technologies (HCL) that operates its primary software business. It develops, markets, sells and supports more than 20 product families in the areas of DevSecOps, Automation, Digital Solutions, Data Management, Marketing and Commerce, and Mainframes.

For more information, visit **hcltechsw.com/OneTest.**

Quality. Delivered.

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Quality. Delivered.

Introduction

Delivering modern applications can be complex.

Beyond the time spent doing research and development to build a product, today's users expect ever higher levels of quality, and could damage a product's reputation via public negative feedback. Yet, companies continue to push for faster release turnarounds without considering a DevOps or a continuous delivery approach. Additionally, delivering a high-quality product to market at a rapid pace can prove to be a costly affair.

A product that is rushed to market with little time for quality assurance can massively damage the reputation of even well-established organizations

As a result, businesses are facing financial constraints, and are being asked to do more work with a smaller workforce. Also, the pressure to streamline and eliminate any additional cost factor is enormous.

Challenges

Over time, the complexity of the software, which quality management teams are expected to test, grows.

It is time to find testing solutions that evolve with changing landscapes.

These large scale, complex applications often span heterogeneous environments with differing systems of engagement and systems of record. Changing software at this scale can lengthen delivery schedules, which in turn leads to higher costs and greater pressure from management.

Customer and business demands add to the challenges for testing teams. But as these change, they can rapidly alter software requirements, which may in turn necessitate upgrades, either of which may depend on other systems and applications. Adopting new technologies, and the fast-paced work environment driven by users who expect more from the applications they work with, will not change.

Solution

HCL OneTest provides software testing tools supporting a DevOps approach.

HCL OneTest supports UI, performance and API testing throughout project lifecycles. It features a script-less, wizard-driven, test authoring environment, and supports more than 100 technologies and protocols.

To achieve DevOps or continuous delivery, software testing teams must automate regression testing to reduce the risk of deploying poor quality software into production.

Effective test automation includes application programming interface (API) testing, user interface testing, and overall system testing. Employing service virtualization in conjunction with test automation allows these tests to be executed earlier, while helping cover a wider range of scenarios.

Together, these HCL OneTest components help automate and run tests earlier and more frequently to discover errors sooner (when they are less costly to fix).

OneTest UI

OneTest Performance

OneTest API

OneTest Data

OneTest Virtualization
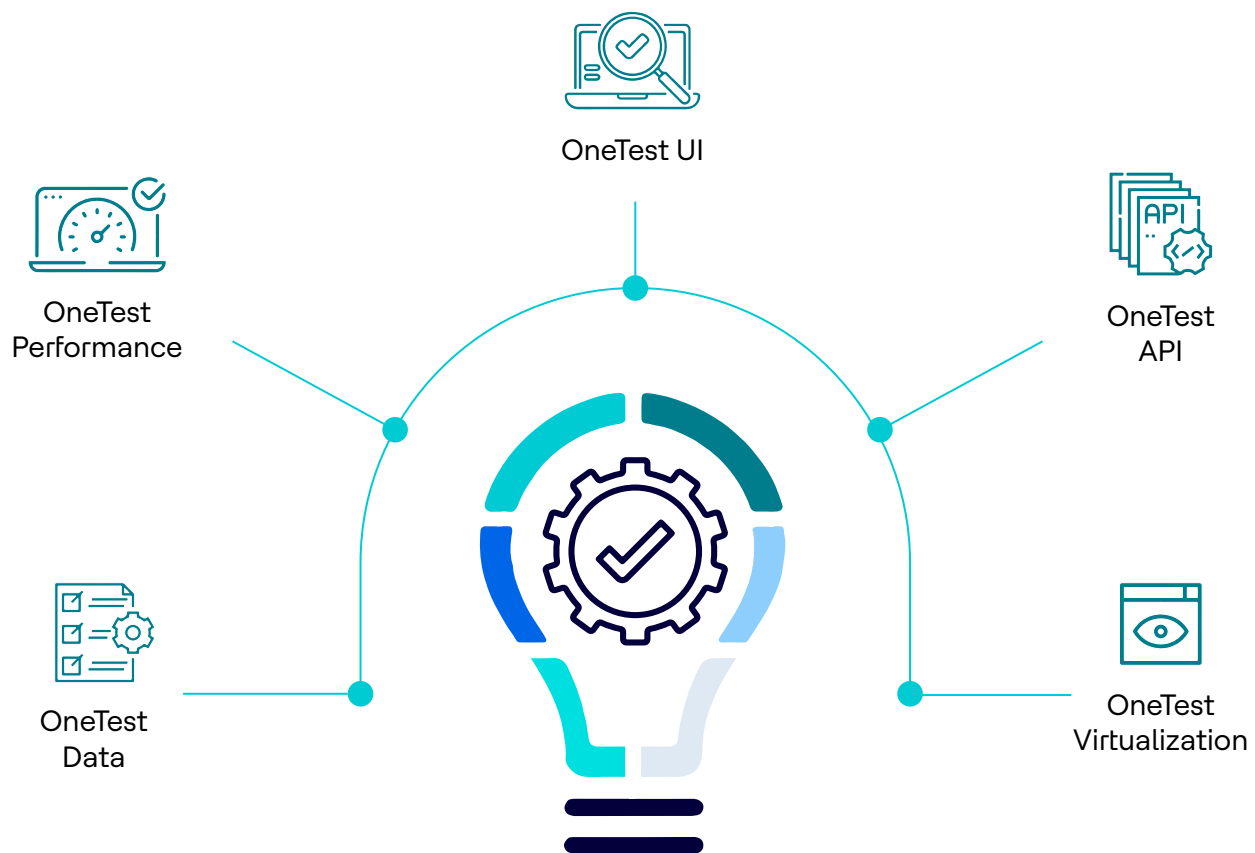
Benefits

UI, API and Performance testing capabilities help meet the challenge of testing highly-integrated and complex applications. HCL OneTest helps with the connections and dependencies between services and components to plan integration test strategies. Coverage reports are generated to help identify, which processes and services require further testing. Such determinations help optimize test development with these results:

Improves Speed And Coverage	Reduces Cost	Improves Quality	Simplifies Teamwork
Automates tests previously done by error-prone manual processes	Fast, comprehensive testing optimized for development environments, while yielding higher quality products	Finds defects early when they're less costly to fix	Follows an execution model and graphic scripting reliance

When continuous testing is implemented as an integral part of a successful DevOps strategy: early, integrated, automated and ongoing testing can address the tradeoff between speed and complete testing.

HCL OneTest provides software testing tools supporting a DevOps approach: API Testing, UI Testing, performance testing, service virtualization and synthetic data fabrication.

HCL **OneTest UI**
Automating And Validating Business Process Flows To Ensure High Application Quality

1

HCL OneTest UI enables testers to take automation all the way from mainframe terminals with 3270 interfaces, through .NET- and Java-based thick client applications. Additionally, it works with the latest top browsers, ERP systems such as SAP and Oracle, right up to HTML5-based responsive web applications that are built on modern frameworks like Angular, React and Vue.js.

Validation of business processes is achieved through simple, yet powerful scripting tools, which empower complex test assertions, created with just a couple of clicks. Integration into DevOps pipelines (Jenkins, UrbanCode, etc.) allows users to embed automated testing in the development process and increase the quality of deliveries.

HCL OneTest UI
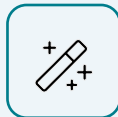
| Capture | Enhance | Execute | Report |

Test data sets - integrated with HCL OneTest Data

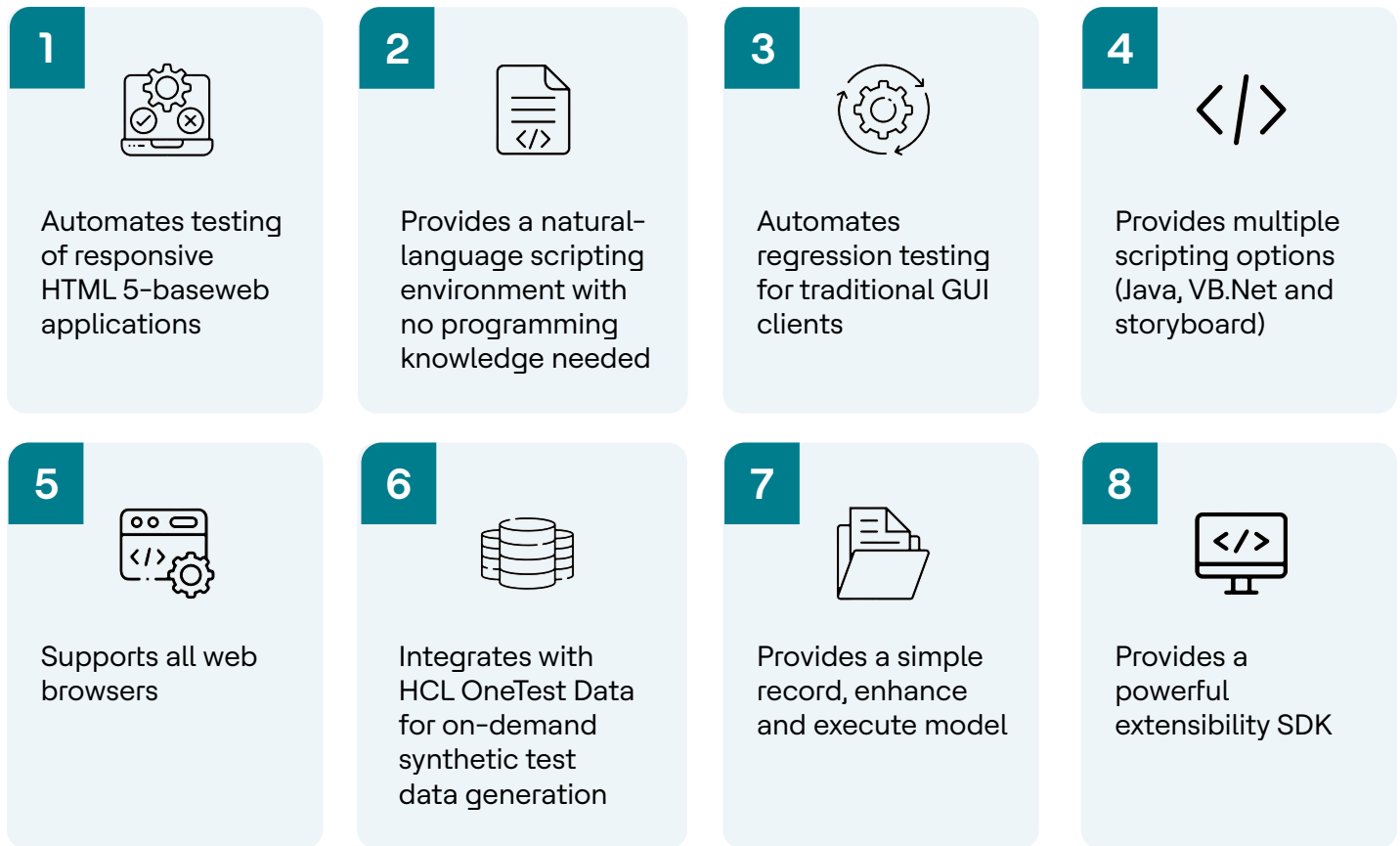Reusable test scripts

| Web Applications | Mobile Applications | Terminal Based Applications | Packaged Applications | Java Applications | .NET Applications |

Capabilities

1 Automates testing of responsive HTML 5-baseweb applications

2 Provides a natural-language scripting environment with no programming knowledge needed

3 Automates regression testing for traditional GUI clients

4 Provides multiple scripting options (Java, VB.Net and storyboard)

5 Supports all web browsers

6 Integrates with HCL OneTest Data for on-demand synthetic test data generation

7 Provides a simple record, enhance and execute model

8 Provides a powerful extensibility SDK

Benefits

- **Improves Speed and Coverage**
  Automates tests previously done by error-prone manual processes

- **Improves Quality**
  Provides fast, comprehensive testing optimized for development environments, while yielding higher quality products

- **Reduces Cost**
  Finds defects early when they're less costly to fix

- **Simplifies Teamwork**
  Helps share tests seamlessly with the OneTest Server collaboration framework

HCL **OneTest Performance**

Identifying And Managing The Risk Of Application Performance Failures

HCL OneTest Performance allows for quickly executing performance tests that analyze the impact of load on applications.
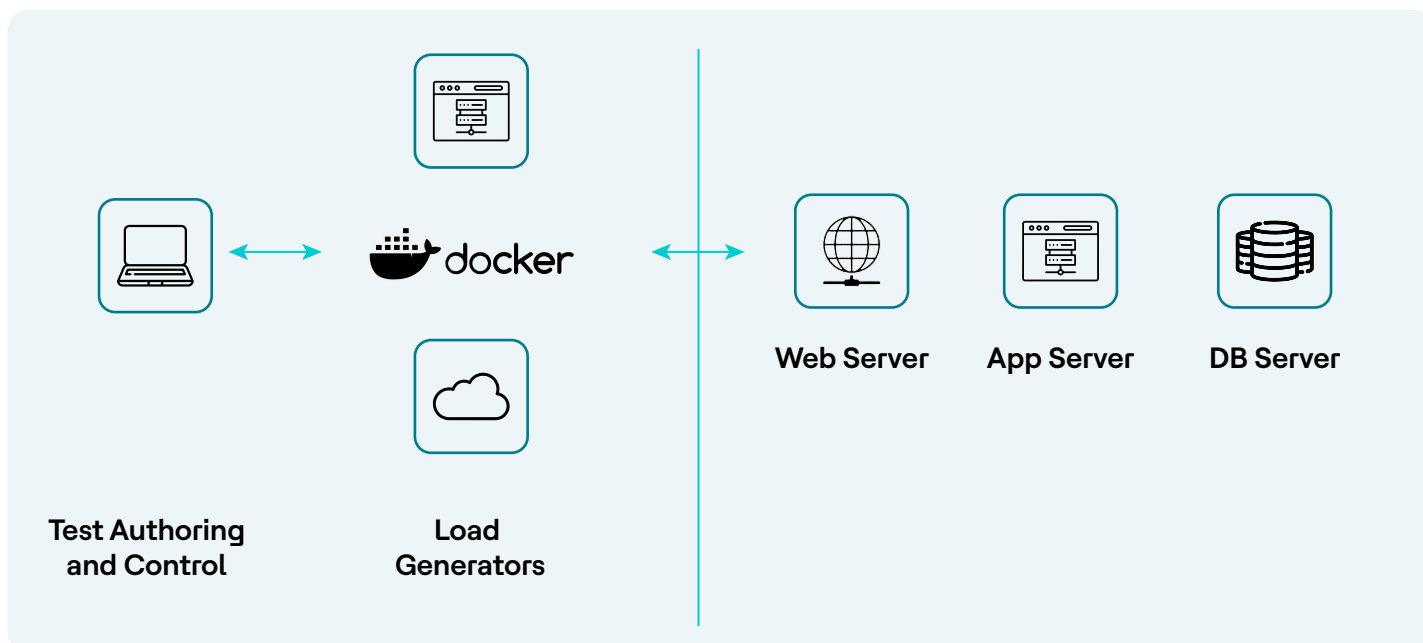
Testers can validate the scalability of web and server-based applications, identify the presence and cause of system performance bottlenecks, while tracking performance changes between versions.

HCL OneTest Performance enables performance testers to easily create realistic workloads that model daily user activities, while eliminating last-minute performance problems. Scalable through bare metal and Docker agents, provisioning a performance test platform has never been easier.
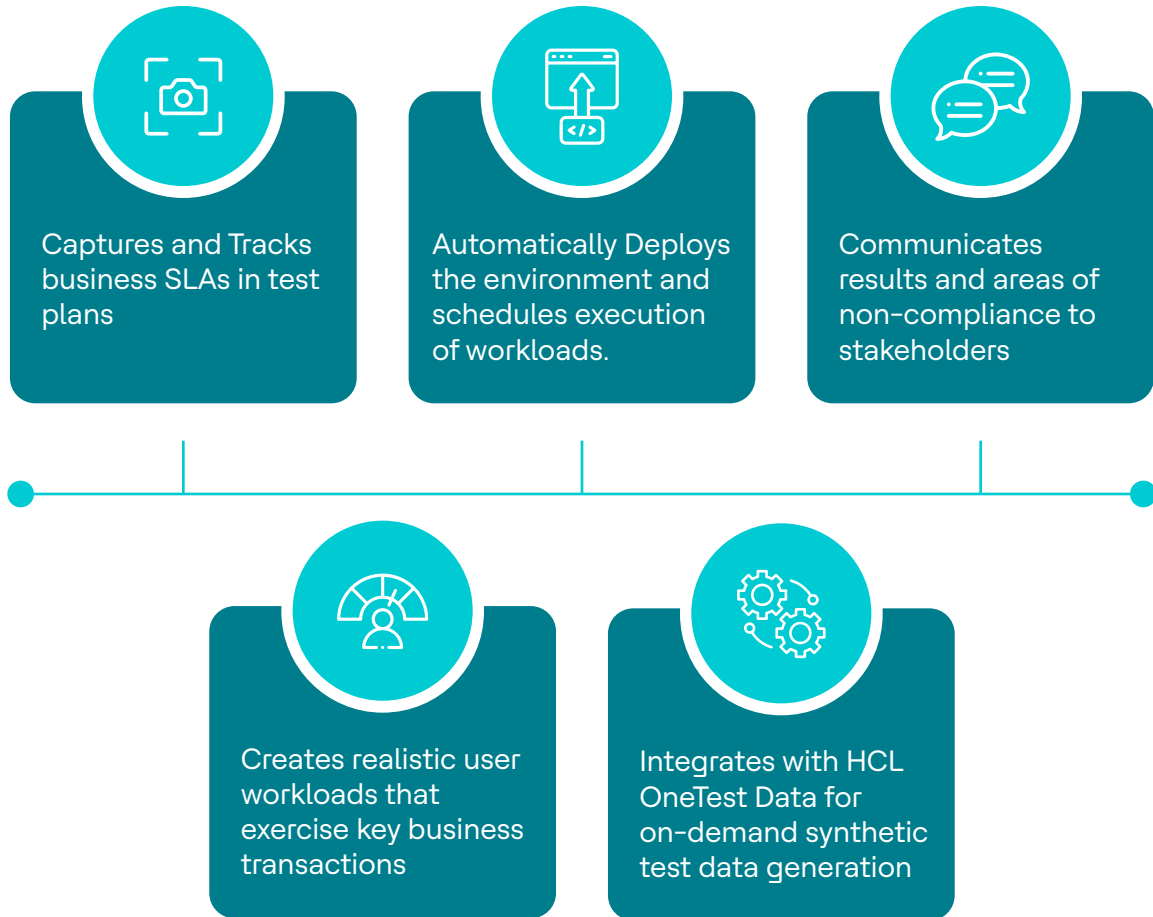
With HCL's DevOps integration, bringing performance quality metrics to delivery pipelines is simple and effective.

HCL OneTest Performance

System Under Test

Test Authoring and Control

Load Generators

Web Server

App Server

DB Server

docker

Capabilities

Captures and Tracks business SLAs in test plans

Automatically Deploys the environment and schedules execution of workloads.

Communicates results and areas of non-compliance to stakeholders

Creates realistic user workloads that exercise key business transactions

Integrates with HCL OneTest Data for on-demand synthetic test data generation

Benefits

- **Improves Quality**
  Yields higher quality products via fast, comprehensive testing that is optimized for development environments

- **Creates Quick Functional Flows**
  Determines if each transaction is executed as quickly as needed

- **Provides Capacity Management**
  Determines if hardware or production configurations need improvement before going live

- **Accommodates Business Needs**
  Checks systems for speed, scalability and stability
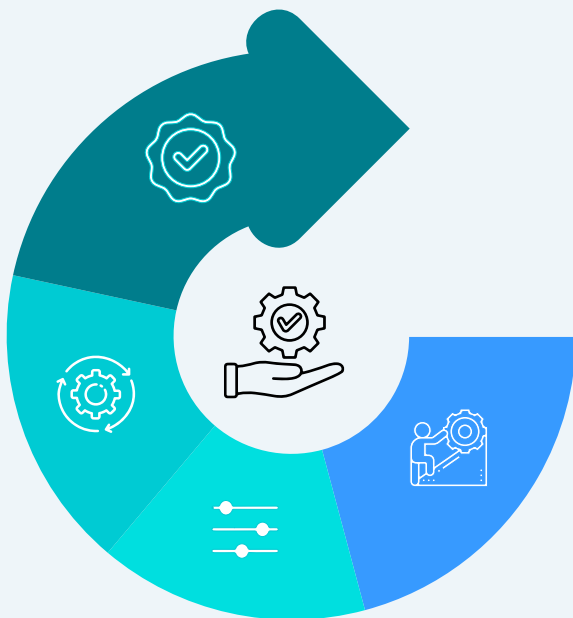
HCL **OneTest API**

Ensuring Sound Integration Of Complex Systems

3

HCL OneTest API triggers and validates a system's APIs across a range of network protocols and message formats.
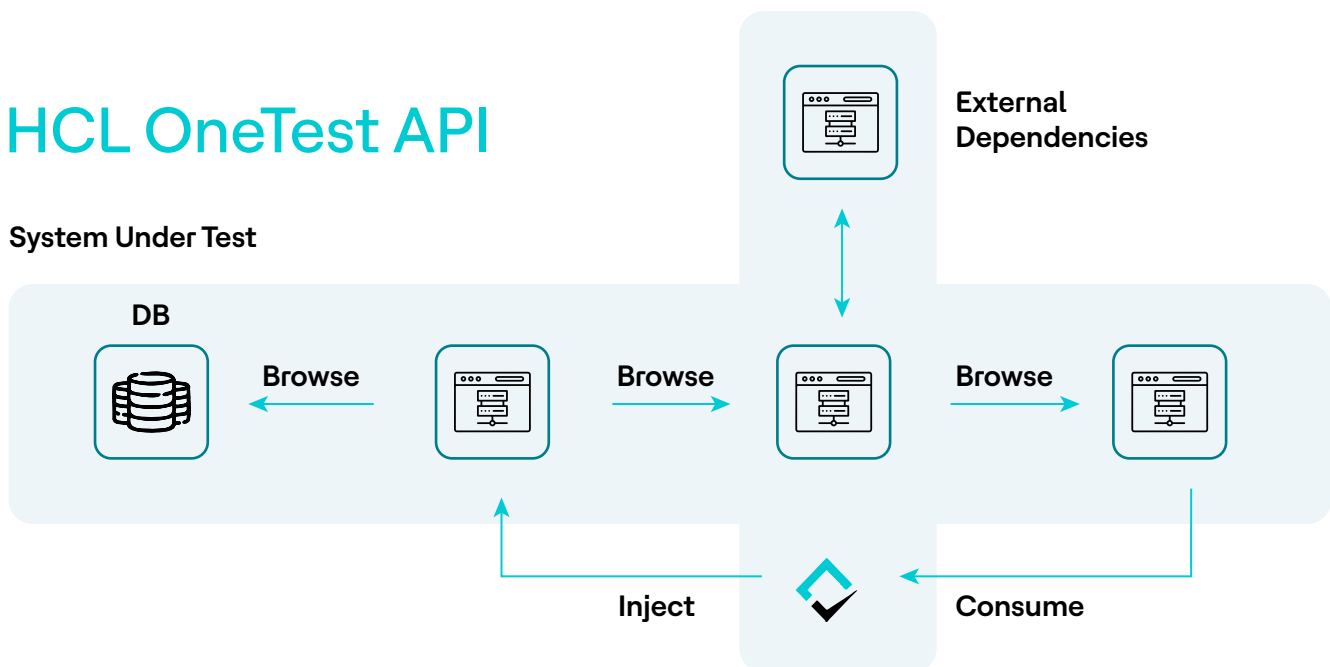
It allows test cases to examine individual exchanges within larger transactions. This can be done in a non-intrusive manner using the same technologies for recording and service virtualization.

HCL OneTest API provides a scripting-free environment for developing tests for enterprise messaging and business process integration projects. HCL OneTest API's authoring environment provides the ability to use the same tools for environment discovery, system modelling and message recording to provide baseline data for creating tests.

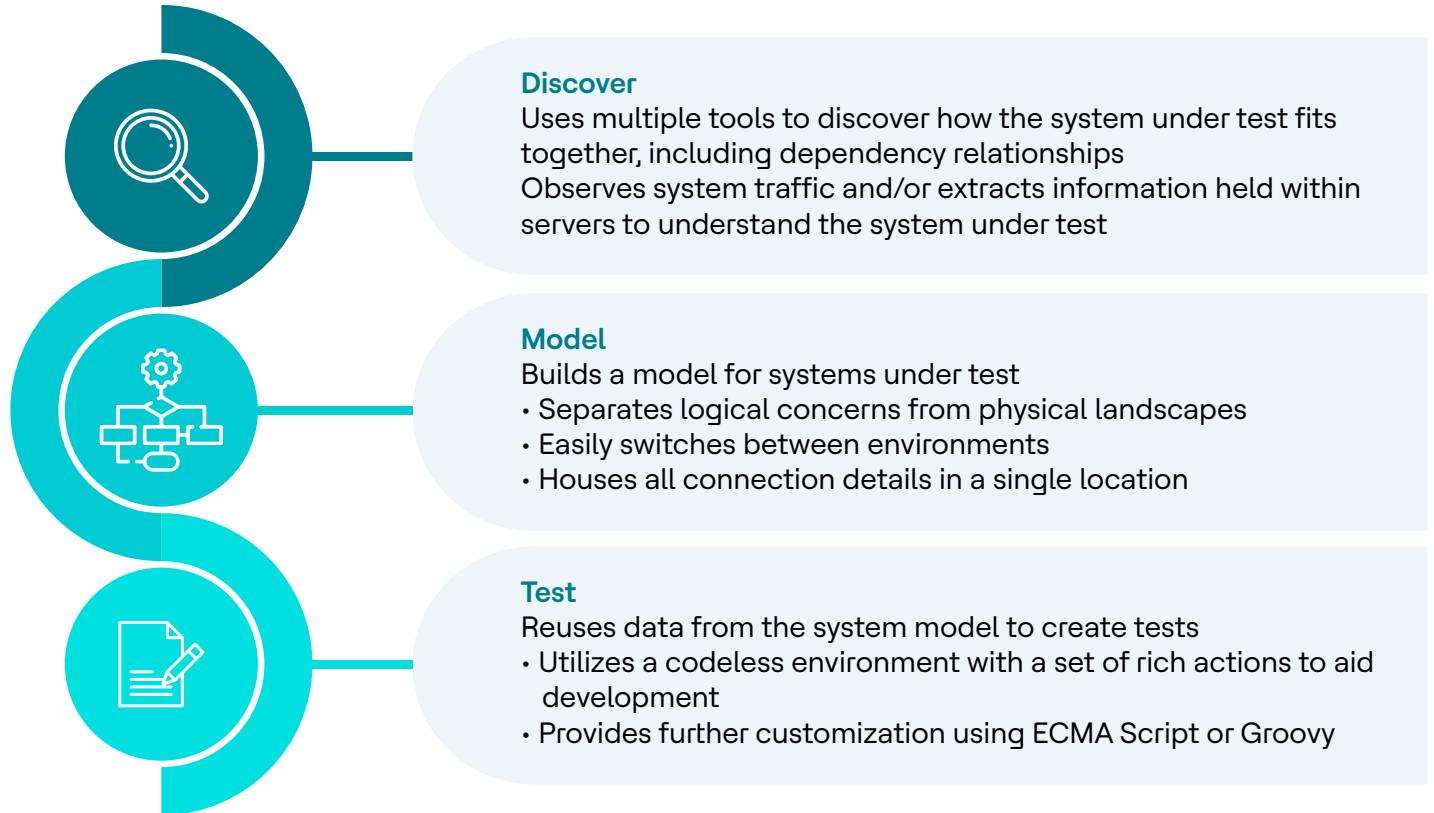Sample messages can be created and referenced in multiple test cases for maximum reusability. These messages can be used as templates, enabling simple updates for a group of tests, and shared validation rules allow re-use of validations across multiple test cases.

HCL OneTest API

External Dependencies

System Under Test

DB

Browse   Browse   Browse

Inject   Consume

Capabilities

Discover
Uses multiple tools to discover how the system under test fits together, including dependency relationships
Observes system traffic and/or extracts information held within servers to understand the system under test

Model
Builds a model for systems under test
• Separates logical concerns from physical landscapes
• Easily switches between environments
• Houses all connection details in a single location

Test
Reuses data from the system model to create tests
• Utilizes a codeless environment with a set of rich actions to aid development
• Provides further customization using ECMA Script or Groovy

Benefits

• **Reduces Risk**
Tests complex integration points between applications before they cause problems. Adapts to constantly-changing business needs

• **Reduces Cost**
Automates at the API layer to test without needing to set up complex end-to-end environments

• **Improves Efficiency**
Shifts testing left to test applications prior to delivery of the UI. Also, enhances coverage, while providing faster feedback to development

HCL **OneTest Data**

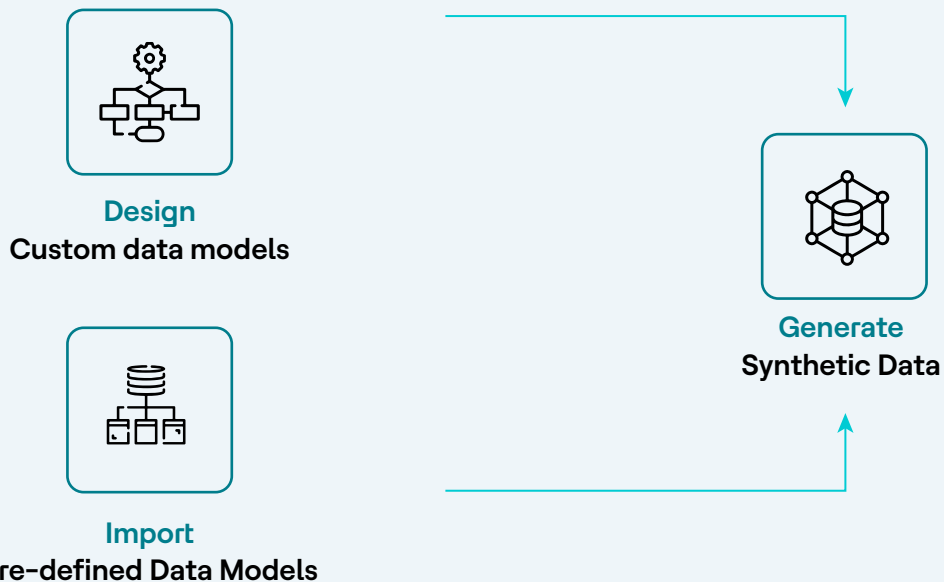## Developing The Data Needed For Testing On Demand

Making sure the right data is on hand for testing can be demanding.

A traditional approach replicates existing data from production systems and uses it in test environments. With GDPR and other privacy regulations in effect, this type of testing has become much riskier, especially where personal data is concerned. There are also many occasions where there is not yet a production system, and so no production data to use.

HCL OneTest Data generates mock data for testing environments and generates synthetic data sets without the risk of data leaks or privacy issues, all on demand.

With a powerful built-in API, testers can generate data in a number of different ways including the use of predefined datasets, data generation rules, or with custom data generation scripts for any environment.

HCL OneTest Data

Design
Custom data models

Generate
Synthetic Data

Import
Pre-defined Data Models

Capabilities

Publishes Data to Relational Databases
Includes all databases that support JDBC

Features an Open Modeling Mechanism
Provides flexible methods to model the data you need including regular expressions, weighting and rules

Flexible Generation File Formats
Produces data in CSV, Excel, JSON, XML, text and binary formats

Powerfully Built-in API
Explores, models, and generates data through REST-based APIs

Easily Seeds Sample Data
Uses Excel or CSV reference files to upload sample data

Invokes Data Generation in the CI/CD Pipeline
Uses HCL UrbanCode Deploy or Jenkins for real-time automated data generation

Benefits
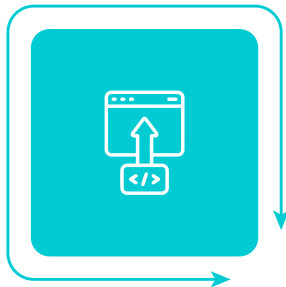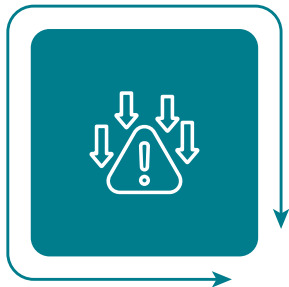
- **Reduces Data Privacy Risks**
  Avoids using real data and violation of data privacy

- **Provides Comprehensive Test Data**
  Creates all the volume and diversity of data required to cover any test scenario

- **Increases Testing Efficiency**
  Provides predefined data sets and real-time data generation for improved efficiency and accuracy

- **Avoids Production System Intrusion**
  Removes the need to extract real and potentially sensitive information

HCL **OneTest** Virtualization
Virtualizing Middle-tier And Back-end Applications

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During the testing process, delivery is often challenged by the fact that different development teams move at different velocities. For example, a mobile team might be able to release reliably every day. However, a middleware team might release on a weekly basis, and a mainframe team may need a month or more to make a release.

This problem could create a bottleneck if the goal is continuous delivery, even with automated testing.

HCL OneTest Virtualization simulates missing system components to enable faster development and testing. It listens for network traffic in the same fashion as the real service, allowing development and testing activities to continue when the real service is unavailable.

Additionally, it checks for incoming messages, processes those messages, and responds according to the behavior described.

HCL OneTest Virtualization can be deployed without having to reconfigure the original environment – saving time and avoiding errors.

HCL OneTest Virtualization

Capabilities

| Validates Customer | Validates Subscription | Checks Customer Profle | Provides Virtual Billing |

Capabilities

Provides a Wide Variety of Protocol and Message Format Support
Mixes and matches all formats as needed

Supports Virtualizing Systems
Removes the need to reconfigure environments when adding or removing virtual services

Generates Accelerators for Understanding the System Under Test
Observes system traffic or extracts information held within systems

Provides Sift and Pass-through Capabilities
Handles specified scenarios with virtual services, while allowing other scenarios to use the live system

Creates Performance Profiles
Uses APM data to provide more realistic response times in virtual services

Features Multiple Construction Options
Allows creation of virtual services via simple record and playback, data driven, ECMA Script, and/or complex data models.

Benefits

Reduces Dependencies	Teams work simultaneously, while reducing internal and external dependencies
Reduces Cost	Reduces infrastructure costs and operating expenses
Improves Quality	Enables teams to start testing earlier to find problems sooner
Reduces Time to Market	Teams work in parallel to increase productivity

HCL **OneTest Embedded**

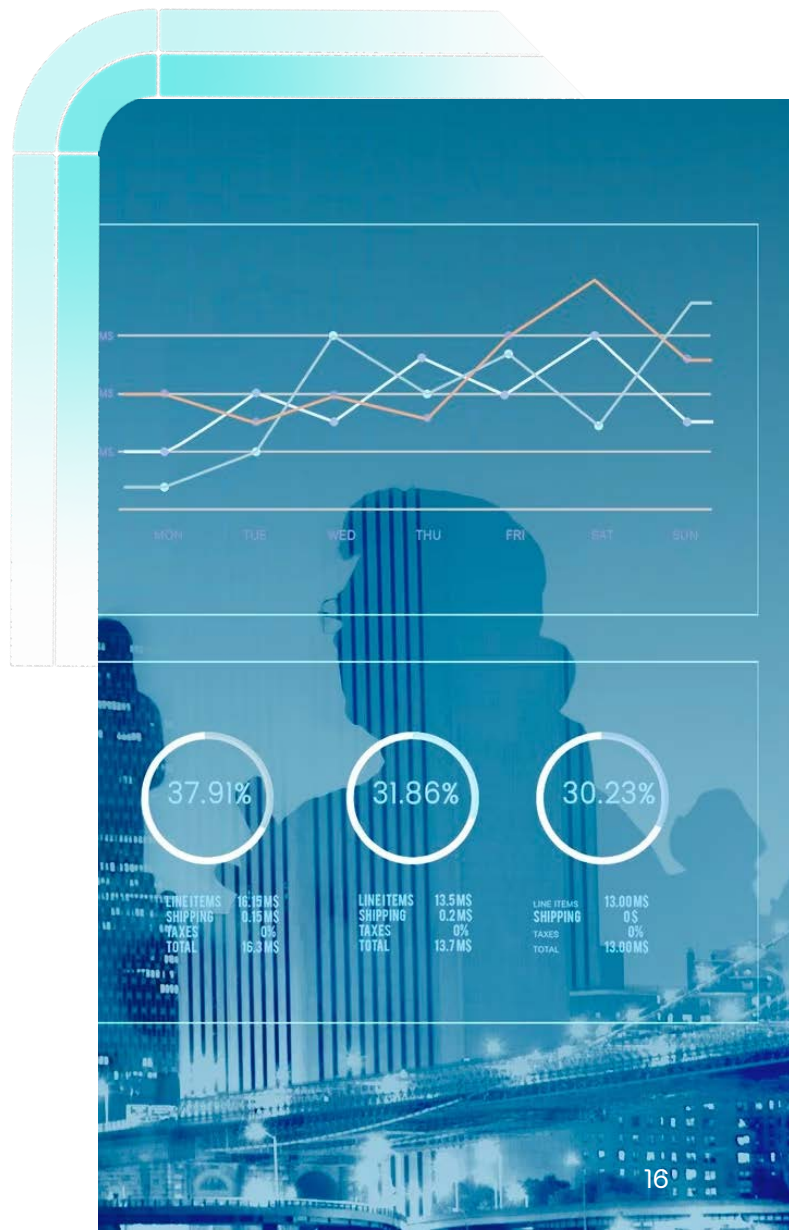## A Cross-platform Solution For Component Testing And Runtime Analysis

6

Automating the creation and deployment of component test harnesses, test stubs and test drivers is a cinch thanks to HCL OneTest Embedded.
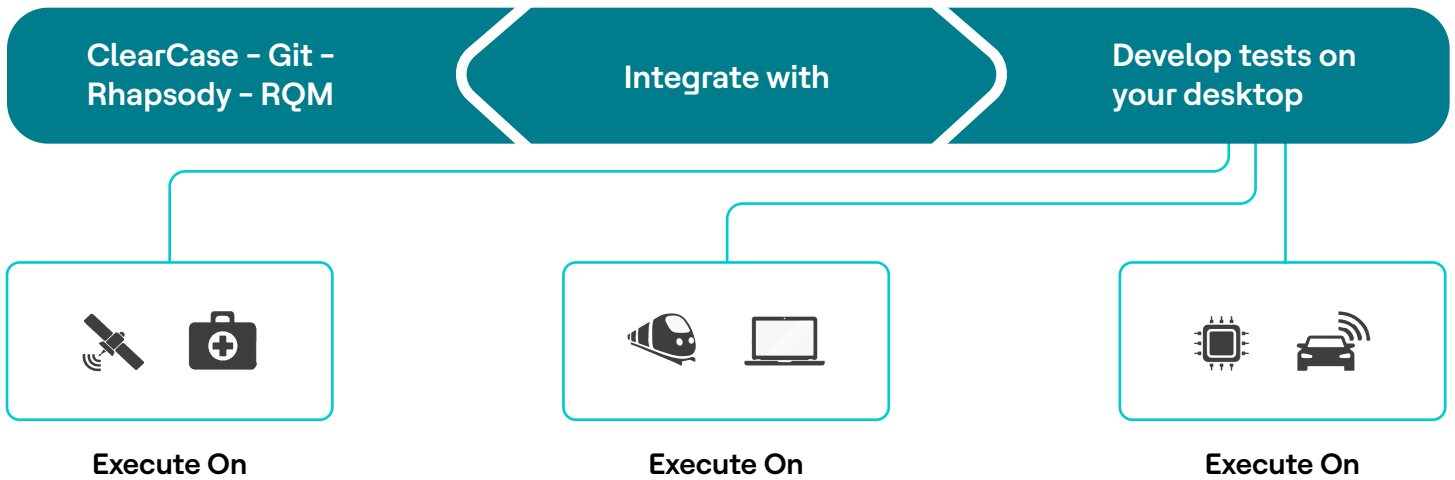
With a single click from any development environment, testers can profile memory and performance, analyze code coverage and visualize program execution behavior.

Additionally, HCL OneTest Embedded helps teams be more proactive in debugging and in fixing code before it breaks.

Highlights:

- Automates component testing and runtime analysis for host and target from a single testing environment

- Profles memory and performance, analyzes code coverage, and visually illustrates runtime tracing

- Easily adapts host-based tests to diferent targets without rewriting test procedures

- Tests and analyzes directly on target. Supports all common platforms — from 8-bit microchips to a 64-BIT RTOS

- Provides detailed code coverage information required for safety and mission-critical certifcation

- Provides code coverage and runtime tracing on-the-fly reports

- Provides Qualifcation Kits for certifcation processes on request

- Verifes coding rules based on MISRA standards

ClearCase - Git - Rhapsody - RQM	Integrate with	Develop tests on your desktop

Execute On   **Execute On**   **Execute On**

Compilers: Microsoft Visual, gcc Cygwin & Mingwin, CodeWarrior, ARM GCC, ARM developer Suite, MicroTech, DiabData, Keil, Android NDK, GreenHills, HighTec TriCore gcc, NEC V850, IAR, Microtec, Tasking, Renesas

Debuggers/simulators: gdb, Hiwave, ARMulator, PowerPC Simulator, Code Composer (Texas Instruments), winIDEA, Infneon TriCore simulator, IAR C-SPY simulator

Real-Time OS: VxWorks, QNX

Targets: HCS08, HCS12, NUCLEO (STMicroelectronics), TMS320, freescale

Test. Analyze. **Resolve.**

The best time to find and fix bugs is during development.

HCL OneTest Embedded focuses on developer testing – the kind only code authors can perform efectively. Additionally, they can easily test written components, and analyze the reliability and performance of applications as they run on host development systems.

Additionally, detailed test and runtime analysis reports are hyperlinked to the relevant source code. HCL OneTest Embedded combines component testing and runtime analysis into a single, integrated developer-centric testing solution.

HCL OneTest Embedded's graphical user interface links runtime analysis results (code coverage and run time analysis) directly to a source code, enabling code repairs without ever having to leave the tool.

Feature	Description	Benefit
Component Testing	Automates creation and deployment of host and target-based component tests. High-level test orientated languages allow sophisticated tests to be easily written.	Increases developer and tester productivity through automation. Allows for a virtual cycle of test generation,execute, review and then test improvement to rapidly achieve full test coverage. One-click to build, to execute on the target and to generate the report.
Memory Profiling	Illustrates how a program's memory is being consumed and possibly leaked. Detects memory leaks, potential memory leaks, buffer under and over runs, misuse of memory after liberation and many other memory management errors.	Identifes the source of memory management errors at the testing phase before they occur in production, preempting performance issues and program crashes. Can be adapted to work with custom memory management methods used in embedded software.
Performance and Worst-case Execution Time	Compute the execution time per function directly on a target and estimate the Worst Case Execution Time	Help the testers to identify the performance issues in the application, and simplify the certifcation by providing an estimation of the WCET.
Code Coverage Analysis	Identifes which portions of the source code that have not been tested from function call up to MC/DC coverage levels.	Helps the developer and tester to develop pertinent test cases. Avoids delivering code that is executed for the frst time by the user or the target system running the application.
Control Coupling Analysis	Analyze the dependencies between modules of the application as described in the CAST-19 and generate coverage reports with control and data coupling.	Simplify the certifcation process by providing required reports for DO178B/C.

Feature	Description	Benefit
Runtime Tracing	Visually illustrates thread execution function calls, and variable values in programs as a function of time via UML sequence diagrams.	Developers can go back in time to review how program behaved after the execution has completed. Integration of test results and code coverage data helps to provide a deep understanding of the behavior of system under test. This information can be gathered on-the-fly whilst the system under test is running.
Target Deployment Technology	Provides a versatile, low-overhead technology for enabling target-independent tests and runtime analysis.	Develop tests on a single host and validate on multiple targets. Tests won't need to change when environments do - test script deployment, execution and reporting remain easy to use without changing test scripts.
Qualifcation Kit	Specifcations and test suites are available to qualify HCL OneTest Embedded with environments and target devices.	Allows qualifcation against many industry standards. See the last page of this brochure for a full list.
Reporting	Generation of reports in various formats (XML, HTML, text, etc.).	Consolidated reports facilitate the certifcation process. Linking of reports allows detailed understanding of the test results.
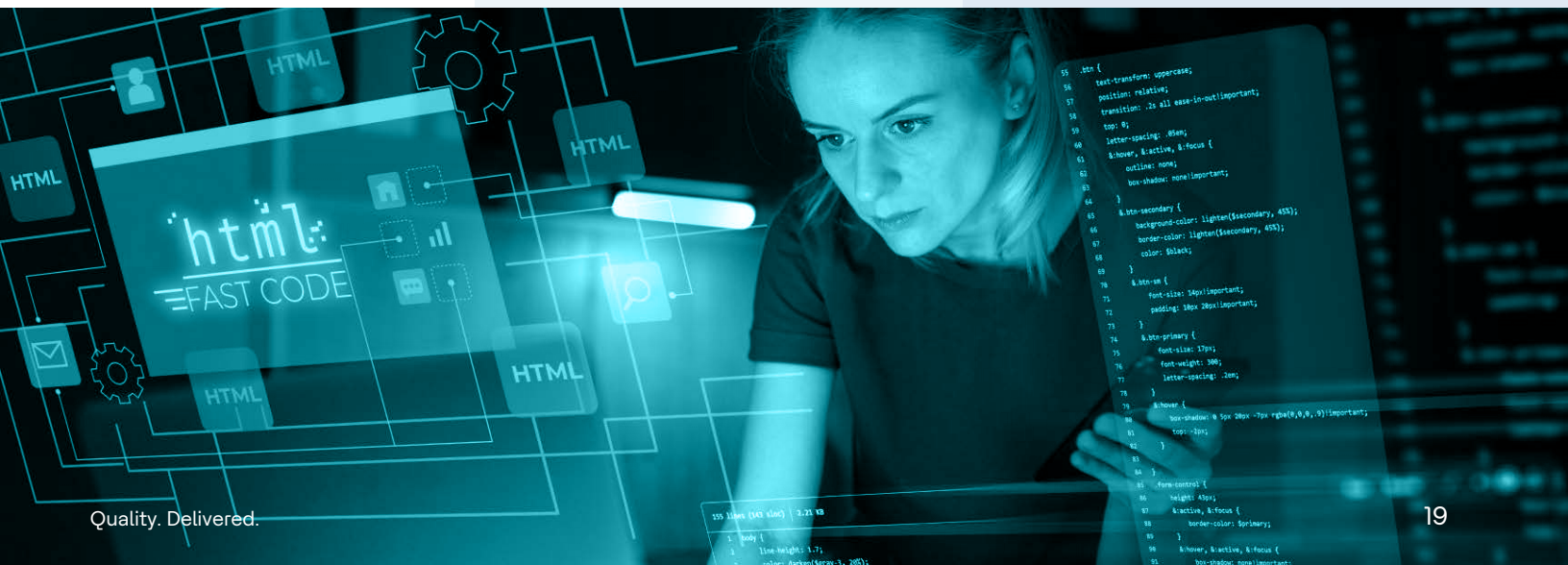
Supported **Platforms**

Programming Languages

C++ C

Ada (component Testing and Code Coverage)

Industry

Aeronautical

Automotive

Defense

Medical / Industrial

Rail

Popular Targets, Others On Demand

Renesas, WindRiver, Lauterbach, Texas Instruments

STMicroARM series — ARM Cortex — Adruino — Raspberry — Windows — Linux — Solaris — Aix — x86 / x64 — GNU toolchains — NXP/FreeScale — ColdFire — Power Architectures — HighTec Tricore

Standards

DO178B/C, DO-330

MISRA 2004, 2012 and ISO-26262

Def Stan 00-55

IEC 62304

EN 50128

HCLSoftware

Fueling the Digital+ Economy

About HCLSoftware

HCLSoftware is a division of HCLTech (HCL) that operates its primary software business. It develops, markets, sells, and suppos over 30 product families in the areas of Digital Transformation, Data Analytics & Insights, AI and Automation, and Enterprise Security. HCLSoftware has offices and labs around the world to serve thousands of customers. Its mission is to drive ultimate customer success with their IT investments through relentless innovation of its products.