opentext™

Performance Engineering

The LoadRunner Family

Implement a proactive, continuous performance engineering discipline that expands performance testing to new roles, tightly integrates into the CI/CD process, monitors performance end-to-end, and facilitates continuous improvement. Combined, these elements ensure that teams can engineer performance early in the lifecycle through the end-user experience.

Discover an approach that goes beyond traditional performance testing and extends into the end-user experience. This approach engineers performance throughout the lifecycle with extensive technology coverage, seamless integration with common tools for scripting, CI/CD, open source, and more.

Why Just Test Performance? Engineer Software Quality

Meeting customer expectations is becoming harder, but these days it's a necessity—especially now that customers can share their opinions on a product or service publicly. In fact, there is a direct correlation between customer engagement and revenue. Technologies continue to evolve, and an app cannot just work. It must consistently perform as expected on every platform, device, and network. Performance engineering teams must harness the speed of change and release software faster while delivering a superior end-user experience. Performance testing can no longer be an afterthought for your organization.

Now more than ever, it's crucial to engineer quality testing earlier in the SDLC by building more realistic tests and enabling increased collaboration across performance teams. The ultimate goal is to deliver high-performance applications that delight and engage your customers.

Traditional Performance Testing Isn't Enough

Performance testing is a non-functional software testing technique that determines the stability, speed, scalability, and responsiveness of an application under a given workload. Performance testing is often a late addition, used in isolation, only deployed once functional testing is over and, in most cases, when the code is ready to release. From developer to performance engineer and business analyst, everyone must work in harmony to deliver a quality app that meets customer expectations. Working in silos causes communication gaps between specialist areas.

In addition, finding a fundamental performance issue at the last minute creates unacceptable delays in time-to-market. This wastes time, money, and resources and, worse, creates pressure to fix the defect while simultaneously staying on schedule for the next release

The Evolved Approach: Performance Engineering

Performance engineering is a proactive, end-to-end performance testing and monitoring discipline that works continuously throughout the software development lifecycle (SDLC). It outperforms traditional performance testing, which **most regard as an addendum to the QA process. Implementing a performance engineering program enables unprecedented, seamless collaboration among your teams and enhances tools and processes.**

Performance engineering has four key attributes:

Expands performance testing responsibilities to new roles while supporting the performance center of excellence (PCoE).

Encapsulates shift-left and shift-right practices for end-to-end performance testing and monitoring.

Facilitates continuous improvement via constant feedback loops and real-time analytics and insights.

Integrates into the CI/CD pipeline to deliver code changes more frequently and reliably to promote collaboration and scale Enterprise DevOps.

Accurately test any application

Performance engineering demands an end-to-end, open architecture solution that supports performance testing across any application type and protocol and in any software development environment and integrated development environment (IDE). Web, mobile, and cloud network conditions are dynamic and vary by provider, location, and time of day. So your test environment must accurately recreate multiple network scenarios to analyze application performance and the effect of network conditions on different user populations.

Accelerate development with virtualization

Composite app initiatives often create a "quality versus speed" dilemma for development and testing teams. They can either meet the project deadline or deliver a high-quality product. The core issue is the growing interdependency among application components. More and more, your organization probably relies on resources from third-party vendors, requiring extra cycles and wait times.

You can resolve this dilemma with Service Virtualization. It accelerates development by removing dependencies on services or components that might not be ready when testing.

Application teams create virtual services that replace targeted services in a composite application or multi-step business process. These services accurately simulate the behavior of the actual component. Developers and testers can then start parallel performance testing immediately. They can also test when data access is restricted, when data is difficult to attain, or when the services are not suitable for the particular test.

The net result is the ability to "shift left" and execute tests earlier in the delivery cycle. Testing earlier draws focus on service quality attributes, such as performance, reliability, and scalability. In short, Service Virtualization delivers both faster delivery times and higher quality services.

Don't standardize, harmonize

As the software development industry changes, so do the job descriptions. Designers, developers, coders, and QA testers are now all responsible for system and application performance. With more people involved, more tools and technology are necessary. Why? It is difficult to require teams to learn new tools, so allowing them to optimize independently is necessary. Using their own tools and methodologies, these empowered teams can meet immediate needs and demands.

Harmonizing instead of standardizing sounds like it could lead to complexity and an explosion of disparate environments. Nevertheless, permitting your teams to leverage their current environment and infrastructure provides every application tester and optimizer with everything they need.

To overcome these challenges, you need end-to-end collaboration and integration from left-to-right and right-to-left, along with real-time analytics and insights. The ability to leverage the same sources of information, with end-to-end visibility from test runs to analytics, helps your teams make better business decisions. Traditional performance testing vendors aren't equipped to address all this potential chaos. However, companies that provide true performance engineering solutions are ready to turn testing chaos into engineered order. That's OpenText.

The LoadRunner Family of Performance Engineering Solutions

You can start performance testing earlier and with more accuracy with the LoadRunner family. Our portfolio of performance engineering solutions offers not only enterprise-grade capabilities but also features for any scale or set of demands.

The family leverages rich integrations, comprehensive analytics, real-world simulations, and continuous feedback loops. Using these capabilities, your team can consistently deliver high-quality applications that meet your users' expectations.

Key Benefits:

Every member of the LoadRunner family shares the following capabilities and benefits, whether on-premises or in the cloud:

1

Delivers the industry's broadest technology and protocol support.

2

Integrates with most scripting, CI/CD, infrastructure, visualization, and monitoring tools.

3

Meets your demands without increasing asset, license, or infrastructure costs.

4

Helps you rapidly pinpoint the root cause and quickly identify bottlenecks, using smart analytics and real-time anomalies.

You won't be held back by limited application support, poor reporting, or lack of scale. Tackle any project with broad coverage, innovative technologies, extensive integrations, and powerful analytics. With the LoadRunner family, your organization can build an effective performance engineering practice. The OpenText performance engineering approach allows you to choose the right tool for the job while leveraging a connected ecosystem that delivers smarter insights, tighter collaboration, and reduced costs.

1 Broad Technology and Protocol Support

It doesn't matter if you are testing the latest web and mobile technologies, legacy applications, or off-the-shelf applications. LoadRunner solutions support the widest range of technologies and protocols in the industry. They also share innovative technologies that can reduce scripting time.

Measuring performance on the server side is not enough. TruClient is a browser-based tool your teams can use to create scripts in real time for load testing or monitoring web and mobile applications. The tool records your actions as you navigate through business processes.

To help evaluate your web applications' performance, DevWeb focuses on communication at the HTTP transport level and over WebSockets, enabling testing against all web technologies. LoadRunner Developer, powered by DevWeb, gives developers the power to create performance tests and share them with performance engineers. These tests foster collaboration by using a language both developers and engineers can understand.

Bringing all scripting capabilities together is Virtual User Generator (VuGen). Emulate the behavior of real users accessing applications on your system by creating and testing scripts with VuGen. Whether you are using VuGen scripts or open source scripts such as JMeter, Gatling, or Selenium, you can easily record, replay, and enhance the scripts for more effective load testing.

Figure 1 - *Broad technology and protocol support*

Network	Oracle E-business	SAP	Mobile and IoT	Templates
DNS	DevWeb	SAP GUI	MQTT	C Vuser
FTP	JMeter	SAP–Web	CoAP	C++ .NET
IMAP	Gatling	SMP–(SAP Mobile	TruClient–Mobile	C# .NET
LDAP	Oracle NCA	Platform)	JMeter	Java Vuser
MAPI	Oracle–Web		Gatling	VB.Net
POP3	Siebel–Web		Web–HTTP/HTML	
Tuxedo	Web–HTTP/HTML		DevWeb	
Winsock				

GUI	SOA	Database	Java	Development
Unified Functional Testing (UFT)	UFT API	ODBC	Java Record Replay	SDK
	Web Services	Oracle–2 Tier	Java over HTTP	Unit Test–NUnit,
			Kafka	JUnit Selenium,
				UFT Developer

Rich Internet Applications	.NET Record & Replay	Remote Access	Remote Desktop
Selenium	Microsoft .NET	Citrix	Microsoft RDP
TruClient–Mobile Web	.NET+	RTD	(Remote Desktop
TruClient–Web		PCoIP	Protocol)

*Not all protocols are supported across all products.

2 Extensive Integrations Enable Continuous Testing

Your operations teams already rely on a wide variety of tools. Therefore, incorporating performance testing in the CI/CD process helps you balance and prioritize responsibilities across developers, testers, and performance engineers.

The LoadRunner family enhances and unifies the solutions DevOps and Agile teams already use:

- IDE integrations accelerate shift-left testing.
- Source code management integrations and support for common open source tools improve coverage and help overcome the tools' limitations.
- Integration with the most common CI/CD tools to increase automation throughout the development lifecycle.
- Extensive application performance management (APM) and monitoring integrations tie in server-side timing and provide additional monitoring for richer analytics.

Using data visualization and storage tools, your teams can leverage top-notch open source software to view real-time results, manipulate data, and make smarter decisions.

Figure 2 - *Extensive integrations enable continuous testing*

OpenText	Monitoring	CI/CD	Containers	IDES
ALM Octane	AppDynamics	Jenkins	Docker	Visual Studio
ALM/Quality Center	Dynatrace	Bamboo	Kubernetes	Eclipse
UFT One	New Relic	TeamCity	Swarm	IntelliJ
UFT Digital Lab	Splunk	Azure DevOps		
Silk Performer	Broadcom APM	AWS CodePipeline		
Silk Test	Datadog	GitHub Actions		
RUM	Prometheus			
SiteScope	Azure Application			
ValueEdge™	Insights			
	Amazon CloudWatch			

Open Source Test Automation	Cloud Providers	Source Code Management	Data Visualization
Gatling	Amazon Web Services (AWS)	Git	Grafana
JMeter	Azure	GitHub	InfluxDB
JUnit	Google Cloud		
NUnit			
Selenium			

*Marks are proprietary of their respective owners. Not all integrations are supported across all products.

3 Flexible and Scalable

A common concern for performance testing is the overall infrastructure, licensing, and maintenance cost. Fortunately, the LoadRunner family's flexible approach helps you minimize these expenses:

- Minimize the duplication of scripts and scenarios by reusing test assets.
- Gain flexibility with the OneLG installer package, and leverage it with any LoadRunner solution.
- Balance short- and long-term projects with multiple license options.
- Minimize infrastructure needs with on-premises, virtual, container, SaaS, and public cloud deployment options.

Along with being flexible, the portfolio easily scales. If you need to scale quickly without adding infrastructure, you can increase cloud capacity using your provider account. You can easily distribute virtual users to multiple cloud locations using Amazon Web Services (AWS), Microsoft Azure, or Google Cloud Platform, as well as on-premises load generators.

4 Smart Analytics and Insights

Given the explosion of different tools and personas participating in the performance process, it is crucial to ensure alignment across your business. Anyone involved in performance engineering must rely on the same information sources to make better business decisions. This best practice requires your teams to agree on the best set of metrics and collectively decide how to use those results.

Understanding your test results can be challenging as you examine data and try to decipher the outcome. A centralized data-collection approach allows your testing teams to connect the dots between the developer, CI, and end-to-end performance tests. For example, automated feedback mechanisms and real-time monitoring empower teams to see and solve problems as they occur.

The correlation of data from telemetry, APM, LoadRunner solutions, and third-party testing tools generates granular results and centrally archives historical data for trending and automated comparisons. You can define a baseline and set up reports that show how the application performance trends over subsequent iterations and performs against defined SLAs. Leveraging data visualization, your team can then view and manipulate data to make smarter decisions. Graphical analysis can significantly reduce the time you spend evaluating data. With detailed root cause analysis, users can display data in real time and offline, which aids trending and anomaly detection.
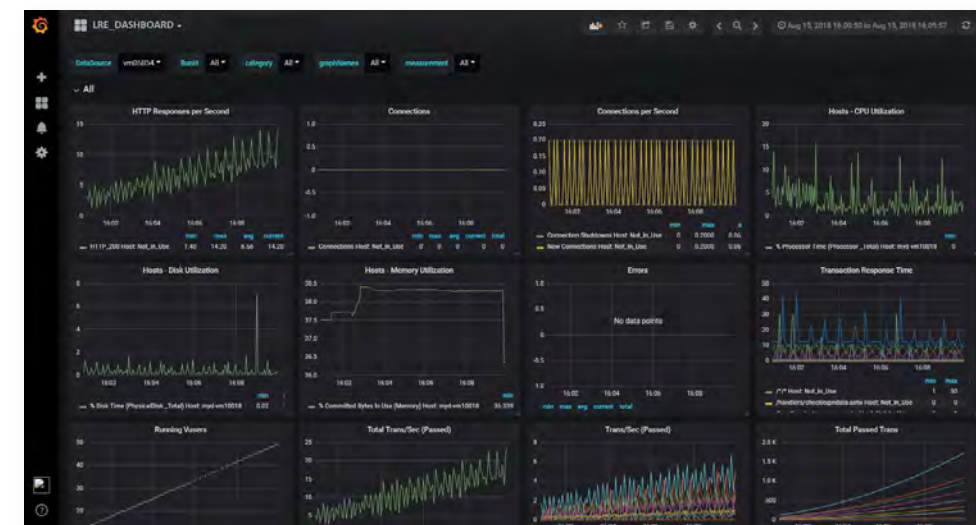
Figure 4 - *Graphical analysis capabilities to easily pinpoint root cause and compare test results*

Performance Engineering with the LoadRunner Family

This integrated set of enterprise-grade performance engineering solutions can work together or independently. With any LoadRunner solution, you can confidently test complex load, stress, and performance scenarios across legacy, website, and mobile applications—while benefitting from shared capabilities and common technology. Ensuring that tools are right-sized for different users, exploiting test reuse, and managing or delivering shared infrastructure helps you develop a performance engineering ecosystem for success.

The LoadRunner family includes:

LoadRunner Professional ›
Versatile and comprehensive performance testing for co-located teams.

LoadRunner Enterprise ›
Collaborative performance testing platform for globally distributed teams.

LoadRunner Cloud ›
Cloud-based performance testing for extreme scale and flexibility.

LoadRunner Developer ›
Shift-left performance testing embedded throughout the SDLC.

LoadRunner Professional

Co-located teams need to test performance across a wide range of application types, different network conditions, and varying service levels.

LoadRunner Professional delivers an intuitive, versatile solution that saves you time, improves code coverage, and provides accurate results.

LoadRunner Professional works for all types of enterprise applications. Create scripts directly with the IDE, enabling performance testing earlier in the application lifecycle. You'll also save time and increase efficiency using automated and graphical analysis tools. Easily manipulate data illustrated in these tools to solve performance issues.

Key benefits:

- Gain an easy-to-use interface for performance testers of all levels.
- Test all types of web, mobile, and packaged applications without heavy customization.
- Implement extensive and flexible test scenarios to assess the impact on every application component.
- Apply real-world workloads to any application with flexible hardware usage.
- Obtain a single view of end-user response time, infrastructure-level, and network breakdown.
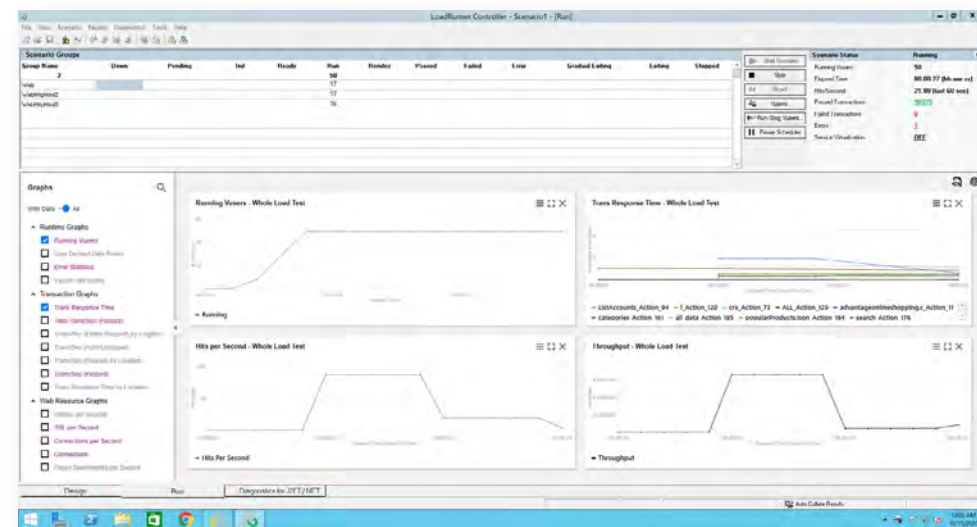- Easily integrate continuous performance testing in the CI/CD process.

Figure 5 - *LoadRunner Professional*

LoadRunner Enterprise

Handling transactions and serving your customers are more complex, so your applications must support any scenario.

Globally distributed performance testing teams are responsible for driving quality across the enterprise while testing a broad range of application types, managing costs, and deploying applications that meet your business's performance requirements. LoadRunner Enterprise delivers a collaborative testing platform that reduces complexity, centralizes resources, and leverages shared assets and licenses.

Designed as a collaborative performance testing platform, a performance center of excellence (PCoE), LoadRunner Enterprise helps your team consistently deliver quality applications across your enterprise. Your global teams share a common infrastructure and can execute multiple performance tests concurrently and continuously. Relevant test assets are also shareable among teams, which increases collaboration.

Advantages abound: License management is easier, redundancy of hardware and software is eliminated, and resources are more accessible to various teams with LoadRunner Enterprise.

Key benefits:

- Quickly deliver enterprise engineering capabilities and facilitate asset sharing and collaboration.
- Reduce complexity and increase the use of infrastructure and human resources.
- Get the big picture with cross-project reporting and individual project drill-downs.
- Increase collaboration and consistency with unified storage and access to all relevant assets.
- Reduce costs with centralized management and built-in support of cloud-based load generation.
- Analyze end-to-end performance, including topology, infrastructure level, and advanced insights.
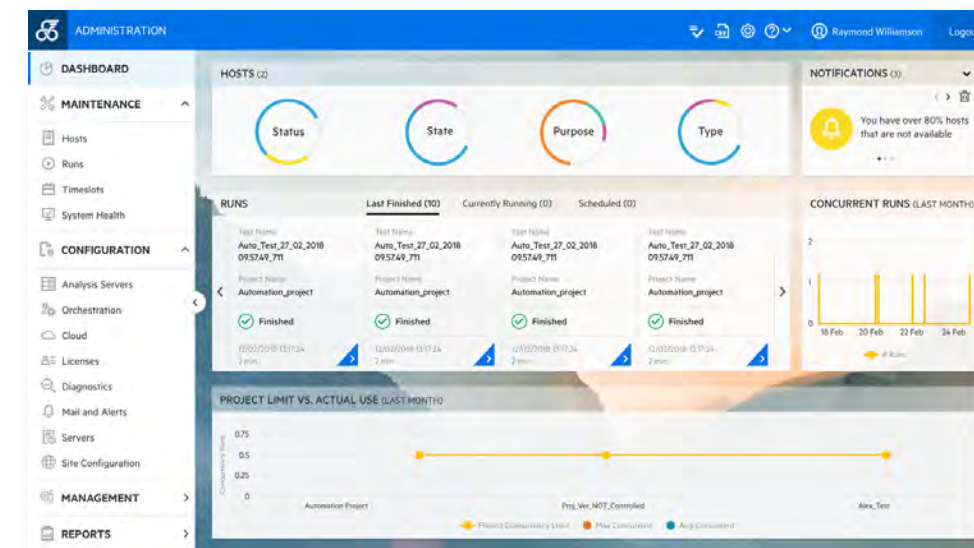

Figure 6 - *LoadRunner Enterprise*

LoadRunner Cloud

Whether you need to test performance at a massive scale or require a collaborative, cloud-based solution for fast-moving Agile and DevOps teams, LoadRunner Cloud can help.

It gives you the simplicity and scale you need to test fast, rapidly pinpoint issues, and deliver high-performing applications.

Your software delivery team has easy access to cloud-based performance testing resources that are just a click away. LoadRunner Cloud offers all the infrastructure, scale, and reporting you want, with no need to install updates for on-premises components.

Key benefits:

- Scale to over five million virtual users for ultimate test coverage.
- Reduce hardware maintenance with a flexible testing model.
- Run tests in multiple locations using public or on-premises load generators.
- Leverage any LoadRunner script and open source tool, or create a test using a REST API, CSV file, or HAR file.
- Help Agile and DevOps teams quickly understand performance issues with smart reports and dashboards.
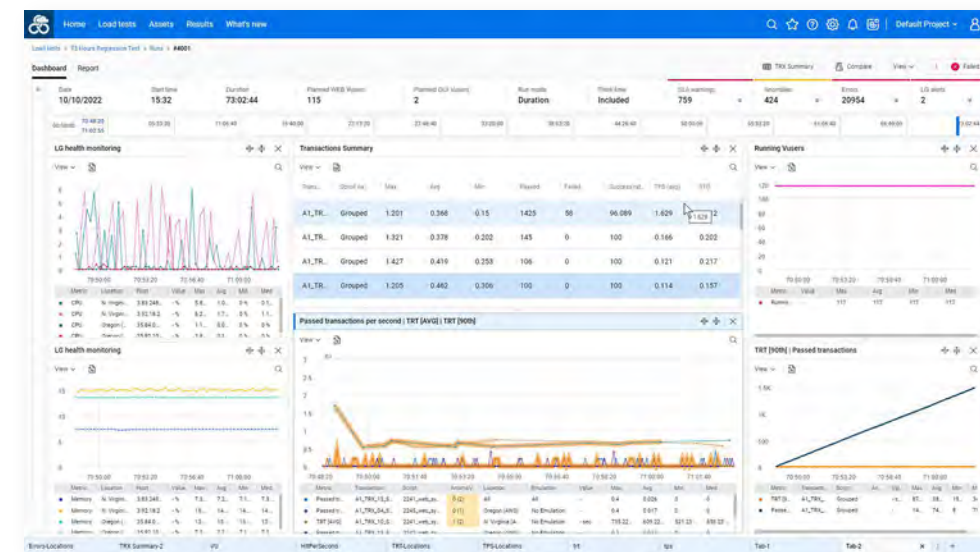- Foster collaboration with multi-user, multi-test execution, asset sharing, and project management.

Figure 7 - *LoadRunner Cloud*

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LoadRunner Developer

In the age of CI/CD pipelines, everyone is responsible for quality. In other words, anyone who can test should test.

Shift-left performance testing gets the developers and devtesters invested in performance engineering earlier. But your developers need the right testing tools, as well as the ability to work in their IDEs.

LoadRunner Developer delivers shift-left testing embedded throughout the SDLC. Developers can quickly execute performance tests, gain initial feedback, and add these assets to the CI pipeline—all within their preferred tool.

Key benefits:

- Leverage developer-friendly capabilities.
- Seamlessly integrate with any IDE and CI tools.
- Get free local execution with up to 50 virtual users.
- Foster collaboration between the PCoE, developers, and devtesters.
- Natively run scripts and reuse assets in all LoadRunner family solutions.
- Scale directly from any IDE using LoadRunner Cloud and LoadRunner Enterprise.

Figure 8 - *LoadRunner Developer*
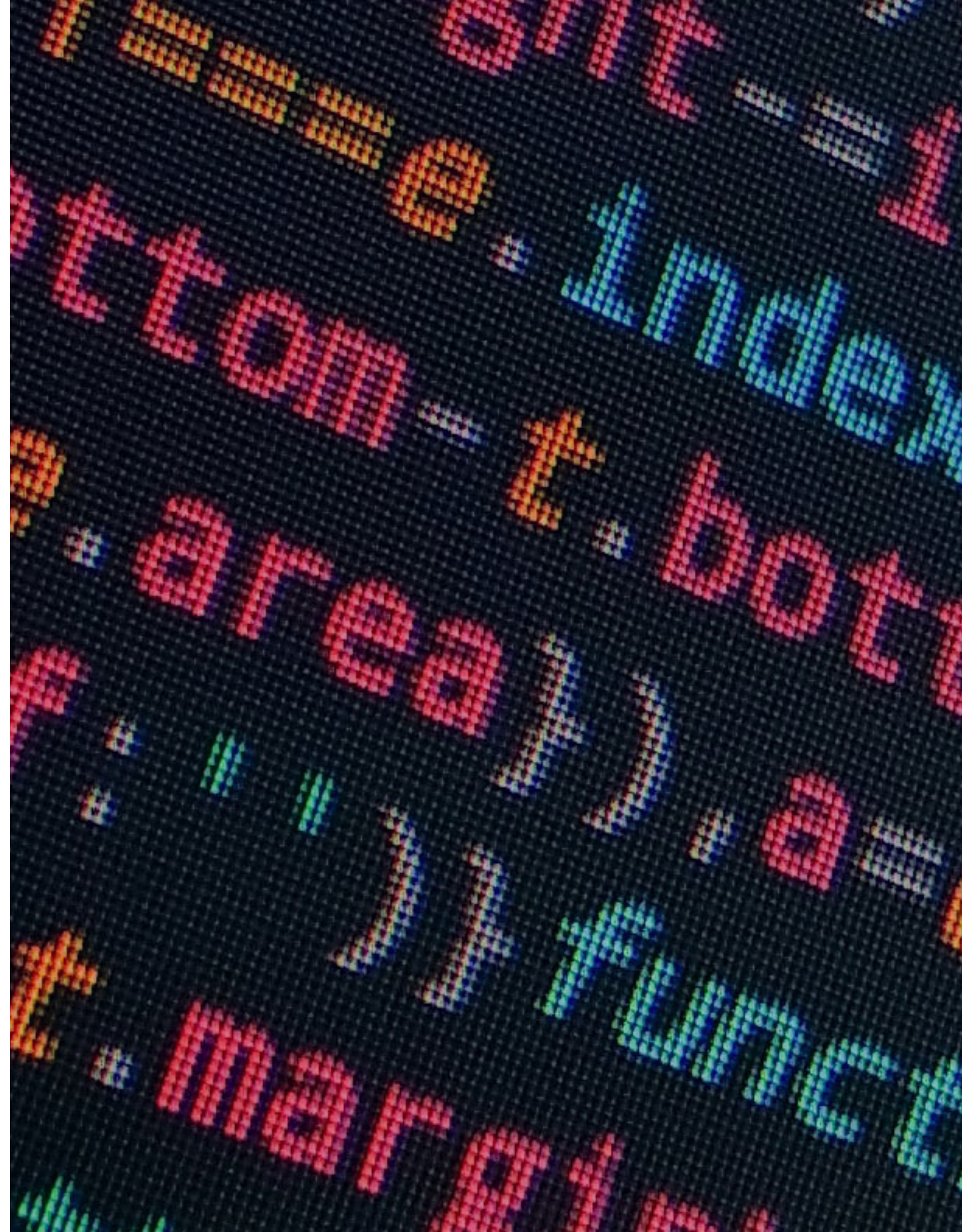
By utilizing any of the LoadRunner family solutions, your organization can develop a performance engineering methodology that scales. Simply choose the right tool for the right job and leverage a connected ecosystem to gain smarter insights, tighter collaboration, and better cost savings.

Learn more about the LoadRunner family of Performance Engineering solutions.

LoadRunner Professional ›
LoadRunner Enterprise ›
LoadRunner Cloud ›
LoadRunner Developer ›
Service Virtualization ›