

Automation Framework Evaluation: Selenium vs Playwright vs Tosca

Purpose

To evaluate Selenium, Playwright, and Tosca as the core test automation framework for our organization, with a focus on **scalability**, **maintainability**, and **future readiness for AI-powered automation**.

Side-by-Side Comparison Table

Criteria	Selenium	Playwright	Tosca
License	Open-source	Open-source	Commercial (Paid)
Ease of Use	Verbose, code-heavy	Modern, developer-friendly	No-code, model-based
Execution Speed	Slower, prone to flakiness	Fast, auto-wait, stable	Slower (GUI automation)
AI/ML Readiness	Manual integration required	AI/LLM-friendly (Python/Java)	Built-in AI (limited extensibility)
Test Coverage	UI + API (via RestAssured)	UI + basic API testing	UI, API, SAP, Mainframe, Mobile
Reporting	Plugins (Extent, Allure)	Built-in support for trace, screenshot, Allure	Built-in dashboards
CI/CD Integration	Jenkins, GitHub Actions, others	Native CI/CD friendly	Jenkins, Tosca Orchestrator
Customization	Highly extensible	Fully scriptable	Limited beyond built-in functions
Skill Requirements	Java/Python required	Dev-friendly (Java/Python/JS)	Minimal technical knowledge
Total Cost of Ownership	Free	Free	High license cost

Final Recommendation: Playwright

Why Playwright?

- Combines the **speed** of headless execution with **built-in reliability** (auto-wait, trace)

- Seamless integration with **AI/LLM pipelines** — ready for GenAI-enhanced test generation, summarization, and self-healing
- Flexible, open, and scalable across environments (dev, QA, staging, prod)
- Cost-effective (open source) with **no vendor lock-in**

AI-Enhanced Roadmap with Playwright

Capability	Description
LLM-based Test Generation	Use models like OpenAI/Gemini to auto-generate test cases from requirements or code diffs
Self-Healing Selectors	Automatically update broken selectors using AI pattern recognition
Failure Root-Cause Summarization	NLP summarization of test logs and failures
Intelligent Test Reruns	AI-based retry prioritization or skipping flaky tests
Parallel Execution & Trace	Trace logs, screenshots, and video capture natively supported

Conclusion

Playwright provides the best combination of speed, cost-efficiency, CI/CD readiness, and AI extensibility. It is the ideal foundation for building a **next-generation, intelligent automation platform** aligned with our digital transformation and quality goals.