CASE STUDY DEVOPS PROCESS

DevSecOps Tools chain selection

London- Summit - 2018 December(Engine Control Unit (ECU))

Makes hundreds of decision per second based on inputs from tens of sensors measuring fuel, engine load, throttle input, gear selection, emission composition, engine temperature, oxygen level, and more. Based on this data, ECU sends signals to dozens of actuators to ensure that the engine runs in the most optimal way.

Quality engineers and developers must iterate to eliminate bugs. Hardware-emulation software is often used to perform the unit test, and then, after integration, associated hardware is incorporated to perform hardware-in-the-loop test.

Once quality is achieved, the final artifacts (binaries and other associated files) are packaged together. While car manufacturers today share the same engine and transmission hardware for many different models, a different set of parameters needs to be configured for each car model. For example, a performance oriented car will have a much more sporty programming than an eco-friendly compact car. This represent a very complex build-test-and-release matrix / permutation.

- **Accelerating builds up to 20X while guaranteeing accurate builds –** with ElectricAccelerator's patented parallelization and dependency-detection technology.
- **Accelerating tests –** We accelerate static analysis (often used to meet safety standards: ISO26262, MISRA) and test execution through parallelizing test across a cluster, and eliminating manual hand offs and processes- such as exception handling or retries.

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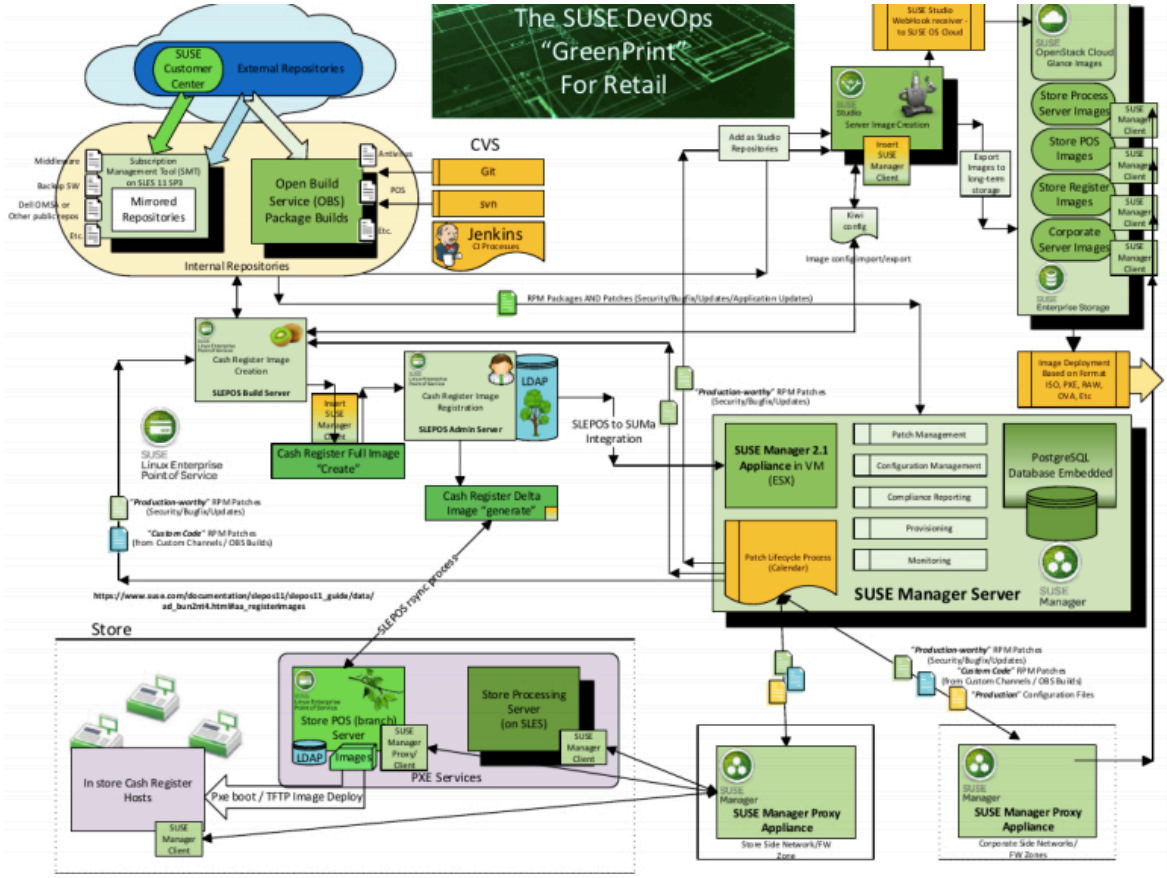
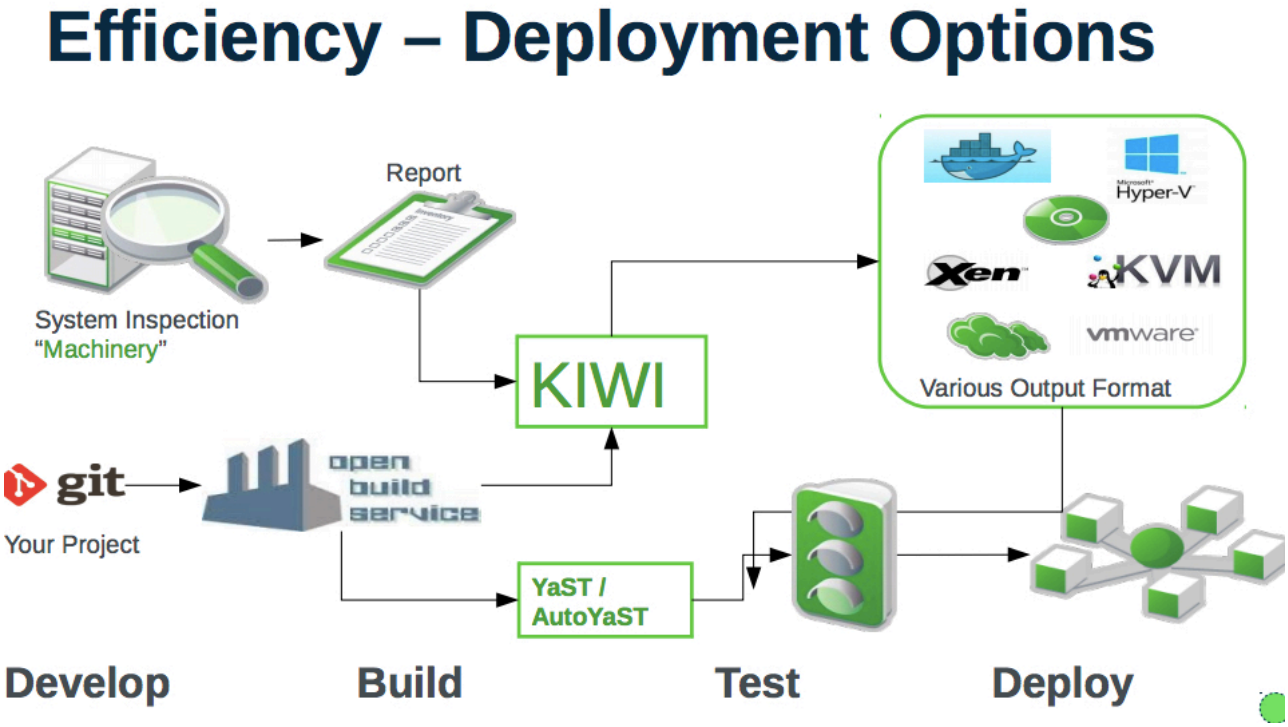
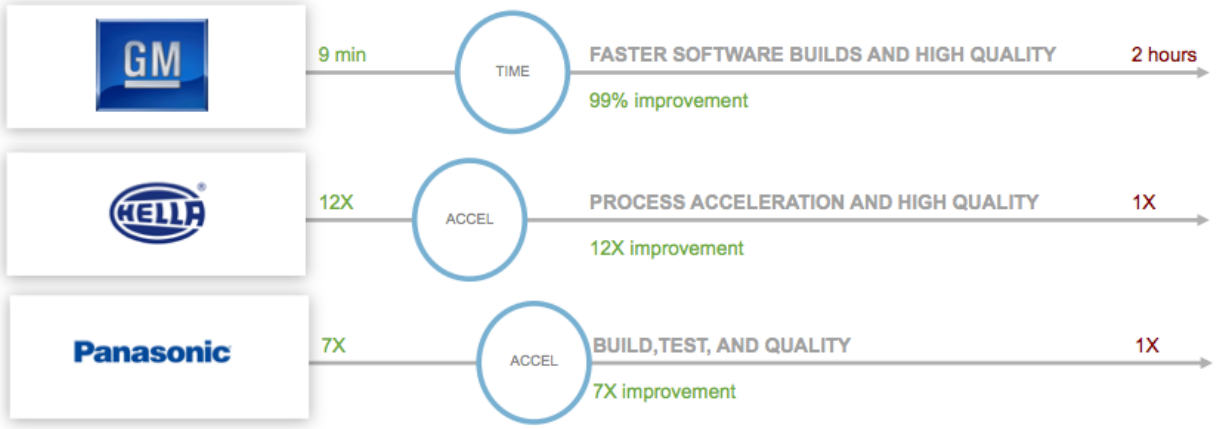


- **Increasing hardware utilisation of your dev and test infrastructure from the typical 50 to over 90.** With Electric Cloud managing your hardware/virtual resources, teams in different time zones can use the same set of hardware with instant automatic setup, configuration, and tear down cycles.
- **Coordinating and orchestrating hundreds of tools in build-test-release cycle to accelerate your end-to-end process.** Electric Cloud automation platform creates a continuous pipeline of the software development life cycle. Hundreds of man-hours are recouped when we automate the manual transfer of bits and the conversion of data from one tool in the chain to other tools downstream . In place of brittle processes that are both time consuming and error prone, the engineer can now just press a button and monitor whether the execution of a series of tools is successful. If there is an error, our solution pin points the issue to simplify troubleshooting. In addition, consequent steps to handle the error can also be configured as part of the automatic workflow.



- **Providing visibility on each project's progress along the build-test-release cycle.**Because we orchestrate hundreds of tools involved in the delivery process, Electric Cloud has access to all the output files and the dynamic parameters to execute each tool. With this data, our solution provides a detailed dashboard for your end-to-end pipeline – indicating the health of the overall project as well as the status of each particular build or process. It also performs trend reporting of success/failure/delays to evaluate the performance and timeline of various projects.
- **Providing software development audit data for MISRA, ISO 26262, SPICE compliance.** Thanks to centralized reporting and visibility into the entire process, Electric Cloud's powerful post-processor extracts out of the mass amounts of data being accumulated the right metrics and event logs required for audit purposes. For example, we have integration with MethodPark Stages tool. We provide the audit data from the software development perspective to Stages. Stages can validate in almost real-time whether the artifacts coming out of the development process are meeting the MISRA, ISO 26262, SPICE standards. By implementing the workflow of build-test-and-release cycle, Electric Cloud enables our customers to achieve SPICE level 3 and 4. It's key that the audit data is available in real-time, in an automated way that eliminates the need for manual, time-consuming, audit processes.



- **Integration with PLM tools.** Electric Cloud provides data to PLM tools, and a PLM tool can invoke software work tasks executed by our orchestration solution. This creates a multi-domain automotive Continuous Delivery – seamlessly integrating data of all the product's components into a single EBOM, reducing design-to-delivery cycles across hardware and software teams, and enables testing of integrated systems earlier and more often.

- **Seamless integration:** With thousands of developers spread around the world, utilizing scalable, shared resources are essential to making things run smoothly. The private cloud approach allows the firm to offer CD as a service to developers.

- **Process automation:** Automation has allowed them to create an environment where they have consistency in the results of the build. Because the extraction of their source code compilation is now automated, every test run is easily repeatable. Bugs are caught early and only progress if previous steps have been tested eliminating bad builds.

- **Collaborative utilisation:** ElectricFlow™ allows teams to continue to use the tools they prefer, providing an automation framework that ties together a variety of different tools including language-specific compilers, code coverage, static analysis, unit testing, defect tracking and much more.

- **Better workflow efficiency:** Development teams gain benefits from their previous investments, while improving the utility of their resources and improve their workflows. Now they are incorporated into a fully automated system as part of a private development cloud.

- **Fast and efficient operation:** The firm has implemented two ElectricFlow instances on their private development cloud. The first supports about 1,000 developers, and serves as a centralized location where one team—the central Development Environments group—provides and maintains infrastructure. The second instance supports about 200 developers and provides an end-to-end workflow