CloudWare™

Eliminating the Pains of Embedded GUI Development with a Cloud-Based Solution

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Introduction

Designing embedded graphical user interfaces (GUIs) for production devices has always had its challenges. Not only must developers create beautiful, feature-rich graphics and a pleasing User Experience (UX) that will win customer loyalty, but there are challenges that still plague experienced engineers. Exploring the old way of developing GUIs uncovers a series of lessons that can be improved upon, starting with difficulties in ensuring consistent software installation and system setups across teams.

Distributed Teams

In recent years, there have been many factors ranging from the COVID-19 pandemic to human capital cost sensitivities, which resulted in a strong push towards highly distributed teams—and now this is part of our reality. These global teams need to coordinate using a limited number of hardware sets. Team members may not have the hardware in front of them and they must rely on other members to test and debug their code on an actual system. This becomes a real problem when using many of the outdated tools in the marketplace that have limited collaboration capabilities.

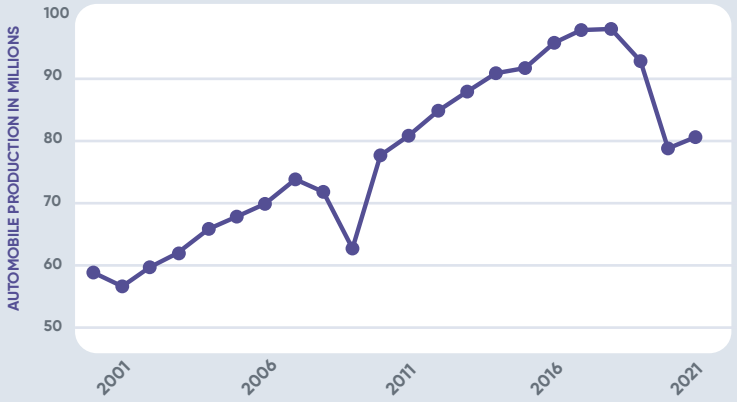
Michael Hill
Vice President, Engineering

"Altia's real-world understanding of the challenges of embedded system setup, configuration and validation inspired the development of Altia CloudWare™," stated Michael Hill, Altia Vice President of Engineering. "We wanted to give our users the ability to rapidly access embedded systems as if they are sitting on their own desks—without the hassle associated with hardware and software management. We have achieved this with CloudWare™."

Shipping hardware between members is an option, however it adds both cost and risk. Not only is there cost involved for shipping and insurance, but if a hardware set is lost or damaged during shipping, there are often long delays for replacement. These delays create unexpected inefficiencies within the delivery pipeline, and they can easily derail software milestones. In addition, shipping costs are always increasing. FedEx, for example, had a 5.9% increase in shipping prices for two years in a row, 2021 and 2022, the largest increase in over a decade [1].

Chip Shortage

Widespread chip shortages are compounding on-time delivery problems, with the lead time for some embedded processors running 52 weeks. In fact, the global automotive output dropped by 15.5 million vehicles over the last four years, from a peak of 97 million [2]. According to the Washington Post, "nearly 17 car manufacturers in North America and Europe had slowed or stopped production due to a lack of computer chips.



[2] "Worldwide Automobile Production since 2000." Statista, Statista, www.statista.com/statistics/262747/worldwide-automobile-production-since-2000/.

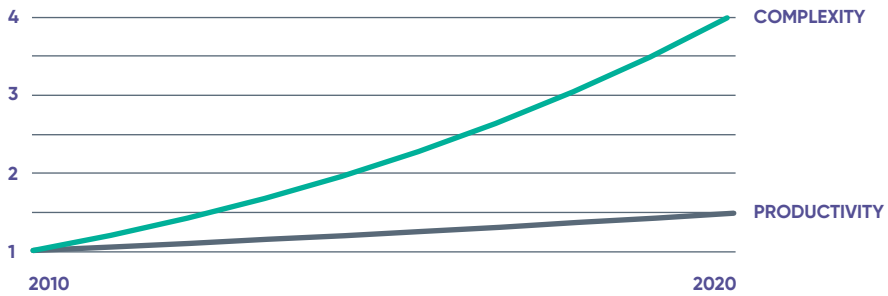
Major automakers like Tesla, Ford, BMW, and General Motors have all been affected." The article goes on to say that the global automobile industry manufactured 4 million fewer cars than planned by the end of 2021 and forfeited $110 billion in revenue [3].

Other industries have been similarly affected by the chip shortage. "At the start of the pandemic, several automakers slashed their vehicle production forecasts before abandoning open semiconductor chip orders. And while the consumer electronics industry stepped in and scooped most of those microchips, the supply couldn't catch up with the demand [3]."

High Expectations

Users of embedded displays expect a gorgeous graphical experience

The users of embedded displays expect a gorgeous graphical experience, which leads to driving increasingly sophisticated user interactions, menu trees, and navigation resulting in larger, more complex code bases. In fact, "the average complexity of individual software projects...has grown by 300 percent over the past decade [4]." When coupled with chip shortages and cost pressures, engineering managers and development teams are faced with difficult decisions that frequently lead to missed production dates.



[4] "Cracking the Complexity Code in Embedded Systems Development." McKinsey & Company, www.mckinsey.com/industries/industrials-and-electronics/our-insights/cracking-the-complexity-code-in-embedded-systems-development.

A Technology Shift

Altia has developed an innovative, forward-thinking solution that addresses these challenges by pairing embedded hardware with a cloud-based software solution. Altia CloudWare™ pairs local GUI design software with remote code generation, programming, and evaluation of graphical interfaces on hardware platforms.

It drastically reduces reliance on physical hardware and complex software configuration while opening a new path to team collaboration.

In early project phases, Altia CloudWare™ removes the need for teams to purchase multiple evaluation boards when trying to choose an appropriate hardware platform. It allows teams to test drive hardware and benchmark different chips for their project before settling on a final platform. This is a key benefit when obtaining evaluation boards can be challenging. The ability for device manufacturers to evaluate and test hardware platforms quickly without large upfront costs shortens the time to market substantially.

Mike Juran
CEO, Altia

"At Altia, we work with companies developing graphical displays for production and we learn a lot about the challenges they have experienced in previous projects. It's our mission is to make embedded GUIs easy, so we created CloudWare™ to simplify benchmarking, testing and running GUI designs on any supported hardware from anywhere in the world," stated Mike Juran, Altia CEO. "With the prevalence of distributed teams, this new tool also enables immediate collaboration with a unified hardware-software stack. GUI teams will turn months of collaboration time into minutes with CloudWare™."

All of the software components—GUI tool, compiler, operating system (OS)—are perfectly aligned to the specific needs of a team's project. By eliminating complex configuration and board bring-up chores, the transition period for new hardware can be reduced by 3-6 months in many cases.

A chip shortage can destroy production forecasts

If a project is already in motion, a chip shortage can destroy production forecasts if an alternative is not found. CloudWare™ allows teams to test existing Altia GUI models on other, more readily available, consumer, and automotive-grade hardware. When a new platform is identified for the design, a team can regenerate code from their existing GUI model and go to production with an available processor rather than waiting many months for the original chipset to become available.

This flexibility also allows teams the opportunity to select older, less state-of-the-art hardware that may be more readily available. The performance on this hardware can be proven in CloudWare™ before committing to a production choice.

Altia CloudWare™ can be a key collaboration tool for companies designing embedded GUIs. According to a recent survey, 79 percent of respondents stated they would be using collaboration software tools for work in 2021—an increase of 44 percent compared to the 2019 figure. Additionally, 38 percent of respondents indicated they would be prototyping a new idea or product with no-code tools.

Both technical and non-technical users benefit from Altia CloudWare™ by easily automating processes and performing tasks with graphical user interfaces on actual hardware. Because designs are in the Cloud, they can be securely accessed from anywhere and inter- or intra-team collaboration becomes seamless. Updates are instantaneous and changes can be tested immediately, allowing for rapid iteration on hardware. A product manager in Germany can see the GUI as it is built by a developer in Canada, providing real-time feedback and quick iteration requests.

What is CloudWare™?

It all starts with the Altia Launcher, which provides a unified platform for distributing a graphical design package, Altia Design. A simple interface launches the version-controlled design environment to a developer's local computer allowing them to make changes quickly and easily. When design requirements are satisfied and ready to deploy on hardware, a single click uploads the changes to Altia's secure and encrypted server. This CloudWare™ server then automatically generates optimized code for the design to execute on the selected hardware platform. In addition, the graphical assets are optimized using automatically selected, lossless compression formats that are supported by the chosen hardware's 2D graphical accelerator or 3D-capable GPU.

Because designs are in the Cloud, they can be securely accessed from anywhere

Once complete, the resulting binaries are downloaded to one Altia's embedded development platforms located in a secure, remote hardware farm. A new window will open in a web browser which provides the interface to the live, CloudWare™ session. Progress is displayed in real time as the libraries are programmed into memory, the hardware is rebooted, and the design comes to life.

The CloudWare™ session provides live video showing the hardware and display, while also providing a hardware capture of the display data that is transformed into a frame buffer stream in real time. Users can directly interact with the display as mouse clicks and drags are routed into the processor, simulating physical touch interaction. Two graphs are updated with CPU load and memory metrics that allow engineers to evaluate system loading and corner cases. This provides a novel method to easily compare different hardware platforms running the same interface.

What's Next for CloudWare™?

Altia's CloudWare™ team is continually adding more platforms with broader industry applications, advanced features, and extended graphics capabilities. Additionally, Altia will be expanding the key performance metrics options for CloudWare™, so users can obtain the precise benchmark and test data they need when evaluating boards and developing their GUIs.

The CloudWare™ team is planning product enhancements including session playback, time travel, bug capturing features, and more.

Conclusion

Altia CloudWare™ is an innovative solution that eliminates the pains of embedded GUI development by using a cloud-based approach. It helps teams access hardware immediately from any location, without lengthy delays or integration periods. They can design and test their graphical user interfaces and scale their existing models to readily available hardware, so they can remove roadblocks, deliver on time, and manufacture products. Additionally, it allows teams to collaborate easily and overcome the challenges created by distributed teams, the chip shortage, and tool stack uncertainty.

Unlike similar solutions, Altia CloudWare™ offers real, production-grade hardware in the cloud—not a virtualized or emulated solution.

References

[1] "FedEx Ground and Express Freight Shipping Rates to Increase in 2023." The Commercial Appeal, Gannett, 25 Sept. 2022, www.commercialappeal.com/story/money/industries/logistics/2022/09/25/fedex-ground-express-freight-shipping-rates-increase-costs-2023/69513919007/.

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[3] "The Chip Shortage: Current Challenges, Predictions, and Potential Solutions." FS Community, fs.com, 28 Apr. 2021, community.fs.com/blog/the-chip-shortage-current-challenges-predictions-and-potential-solutions.html.

Contact Us

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