

Key Technology improves products using Linux to support applications in Cincom Smalltalk™



Key Technology

Situation:

In the years since Cincom Systems last profiled Key Technology, Inc., Key has expanded into new regional and product markets as a worldwide leader in process automation systems for food processing and industry. As this Walla Walla, Washington company grows, it reaches out to customers having specialized requirements.

To address those requirements, Key Technology investigated an open operating system, Linux. But with many years of applications written in Cincom Smalltalk, Key's software engineers had to ensure platform compatibility while continually improving product performance. They soon discovered they had no reason to worry.

As the manufacturer of Tegra, the first automated optical sorter of its kind, Key Technology had discovered by 1999 that Cincom Smalltalk VisualWorks' portability and flexibility enabled Key to sort additional products, offer new features, and improve scalability. For instance, Key had leveraged the object-oriented VisualWorks to create a unique user interface for each system.

Key Technology markets Tegra and other material-handling systems for removing impurities from whole and processed foods, sorting products by size, and inspecting such nonfood items as product packages and titanium ore. With its ISO-9001 certification, Key prides itself on systems that improve quality, increase yield, and reduce cost for its customers, including McCain, Lamb-West, and Bolthouse Farms. Key claims aggressive research and development as its hallmarks.

Goal: Adapt current turnkey systems for the Linux operating system.

Challenges:

- Resolve numerous issues with Microsoft Windows.
- Improve product performance.
- Satisfy customers' expectations as their OEM vendor.
- Preserve the investment in the products' application software.

Solution: Cincom® VisualWorks® on Linux

Results:

- Successful deployment of turnkey systems with Linux.
- Rapid prototyping of new sorting and selection algorithms.
- Better and faster product performance.
- Expansion to new markets with adapted systems.

Adopting Linux for a new generation of products

As an original equipment manufacturer (OEM), Key is expected to assume full responsibility for its systems. Increasingly, Key differed with Microsoft on log-in issues, OS upgrades, “headless” operations (i.e., without a user interface), and costs.

Key evaluated Linux for a second generation of Tegra sorters because Linux appeared to offer OEMs more choice and control compared with Windows: open source, more variety of hardware deployments, faster performance with Key’s applications, more efficient networking, and so on.

“The Linux open source model was kind of a no-brainer,” said a senior software engineer at Key. “We own the system, we can take responsibility if we want to do something, and we’re not kept back from doing it,” he said. Because Key uses separate CPUs for the user interface, core logic, and device communication, having one operating system for all “was a big advantage for us.”

Sticking with Cincom Smalltalk VisualWorks

Would the Smalltalk development environment work on Linux? “It’s still the ultimate development platform,” the software engineer said. “Having Smalltalk on there is a huge benefit for us, because it allows us to do cool UI stuff without having to use some rather arcane style tools. I think that any Linux programmer would benefit from being able to write VisualWorks apps, because it’s such a strong application development platform,” he said. “There’s a natural fit between the two platforms.”

“We are the only company that offers an appreciable user interface on their sorters,” the engineer declared. Because the machine operator is more productive, Key’s customer is more profitable.

With more adaptable sorters, Key had found new customers sorting new products: peas, asparagus, peaches, pears, raisins, and tobacco. Niche markets include cereals, snack foods, nuts, and titanium ore.

“The kind [of titanium] you use in aircraft turbines cannot have an impurity,” the senior software engineer explained. “We actually used an algorithm to adapt to the product, and that was something that we prototyped in Smalltalk. We could have prototyped in another language, but [VisualWorks] allowed me to throw together a prototype very quickly.”

Key adapts its systems for one-off solutions and OLE Process Control. Networked under OPC, machines report data and centralize analysis, logging, and control, working together toward a goal greater than they could achieve separately. This is particularly attractive to tobacco companies and other lights-out manufacturers. “We used the good web-services stuff in VisualWorks to build an OPC server out of our systems,” the engineer said.

The savings and productivity that Key’s customers reaped with its systems defined Key as the dominant player in its market – and the only player when it performs a task not otherwise affordable. One of the software engineers explained that cherry producers, for example, once sorted the fruit mechanically, but poorly and unreliably, in several sizes. Each size increment sells for as much as 20 cents more per pound. “It doesn’t seem like that big of a deal until you see numbers: in the U.S., they do 210 million pounds of cherries!”

Amazingly, just seven developers are responsible for all of this system development and adaptation. One of these developers acknowledges their accomplishments: “The people outside my team don’t know how great a product VisualWorks has been for us,” he said. “A lot [of the team’s productivity] is because we’ve got great people, but it’s mostly because of Smalltalk.”

