

## Keeping a watch on the enterprise

By Sam Varghese  
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A Linux-based industrial surveillance system developed in Melbourne is set to make its debut in the market towards the end of the first quarter this year. Local software house Safehouse is behind the package which is aimed at medium and large set-ups, according to the company's chief technical officer, Michael Henson.



Michael Henson and Hamish McKirdy.

Clarity, the visual surveillance workstation, is the result of nearly three years of development; the company's first product, iCount, which is used for making a headcount of crowds, was released in March 2002, has sold over 50 licences and is being used by the Melbourne Exhibition Centre and the National Gallery of Victoria at its Federation Square site. Installation is going on at the NGV's St Kilda site.

Initially founded in the UK and Australia in 1998, Safehouse was geared towards providing security for art galleries. The company initially developed a Windows-based package for the National Gallery of Victoria. "We worked with NGV, developed and tested the software. It highlighted a lot of issues - like, for instance, nobody at the gallery was aware of how many people were touching the paintings there," said Henson.

However, when it came to deployment, the costs got in the way. It was too expensive to be deployed and Safehouse had to defer development until such time as the costs to the customer could be reduced.

After some internal changes, the company then started development on the people counting software, maintaining cross-platform compatibility for some time. But after Linux started taking hold, around May 2001, Henson decided that they would develop for only a Unix platform.

"We found that using open source development tools was both cheaper and better. We wanted POSIX-compliance, performance and good development

tools - editors, debuggers and mechanisms for source control," he said. "Had we wanted to do it for Windows, we would have had an outlay of around \$16,000 per developer for the tools."

This was quite clearly an expense which Safehouse could not afford; after some kind of a staff cleanout and finding what Henson termed "the right kind of people", development went ahead using open source tools.

"Don't get me wrong, something like Microsoft's .NET or MFC would be fine for 95 percent of applications which are used in the enterprise," Henson said. "but in the case of the kind of software we are developing, neither is suited. You can't have cargo cult programming when you're writing this kind of software" - a reference to a style of programming which is dominated by ritual insertion of code with little understanding of why the code was necessary or how it works.

Nine people have worked on the package and have been with Safehouse for over two years, opting to continue working even through a period when the company had little money to pay them.

The software serves one main purpose - substantially reducing the amount of data which an operator has to view, based on the Intelligence Engines within the system. "Earlier, there was an operator looking at, say, 20 cameras - he would scan them visually and then hone in on any one that seemed to warrant attention," said Henson. "Now we are giving that same operator, say, three cameras to look at - because the system has determined that only those three cameras have footage that he needs to examine closely."

Analog cameras are used at the moment; Henson plans on supporting IP cameras once these become available in sufficient volume and with specs suited to industrial needs. Per camera costs are around \$2000 though this amount decreases as the number of cameras increases. "A two-door set-up with eight cameras cost around \$US60,000 for hardware, software and setting up for a company in the US," Henson said.

Data is fed to the datastore by the cameras after having been filtered through the proprietary Intelligence Engines created by Safehouse. What gets stored is decided by the way the engines are configured and this depends on situational needs. For example, there can be instructions to store objects only moving at a defined "abnormal" speed - as an example, one can have a camera focusing on the road and only capturing the movement of cars with the constant motion of trees being ignored. **(Screenshots are [here.](#))**

Else, a certain pattern of behaviour can be defined - such as number plate detection, face recognition, people grouping and so on. "The whole package has only about half a million lines of code because a lot of it is creatively re-used," Henson said. "We have managed to avoid software bloat though that may set in as we continue development. Hardware requirements are low - the input of 8 cameras (processing, storage and retrieval) can be managed by a 3Ghz dual-CPU box."

Right now, the company uses Red Hat Linux, "because we wanted to get the product running on as diverse a range of hardware as possible. We use it to bootstrap the installation procedure and then use our own software to install a new kernel, if needed, along with the surveillance software," Henson said.

However, after Red Hat decided to make its consumer distribution a community project, Henson has started looking at other distributions like Gentoo and Debian. "It has caused us some problems," he admitted. "But then Red Hat is a commercial distribution and they have gone that route because they see it as the way by which they can turn a profit."

Some time has been lost en route, especially after August 2001, when the company set up an US arm, to raise money for development. "We wasted a year trying to raise money - we raised and spent more or less the same amount," said Henson.

There are more modest expectations now. Henson found that it was extremely difficult to get people in the US to seriously consider an industrial surveillance system which was going to run on Linux. "People there are conservative and acceptance of Linux at that time wasn't very high," he said.

He is comfortable with using open source software to develop surveillance applications. "We keep to the licensing terms and give back what we can to the community," he said. "Our aim is to make this as non-intrusive as possible, to introduce accountability without unduly trespassing on individual territory.

"I justify it by the fact that we are making it easier for people to pick up activity that is disallowed by the law of the state in which the software is being used. That's something the individual is supposed to respect - the software is just helping enforce compliance."

Safehouse marketing manager Hamish McKirdy said issues of privacy were the first to be raised whenever the company personnel made presentations to prospective clients. "Such considerations have to be paramount else we wouldn't be able to make any sales," he said.

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