



OPERATING SYSTEM

Automated cities

Cat Hackforth talks to the creators of the world's first city-wide OS

While you're at work, a discarded cigarette sets light to a bin and fire

begins to lick up the building. As the fire alarm sounds, the light panels on the office wall turn green and their 12 x 12 LED grids display scrolling arrows that direct you to the nearest fire exit. Sensors in the building's structure alert the emergency services, who are directed to the blaze by a yellow line, again displayed on the LED panels. The fire is quickly extinguished, and further sensors built into the office

confirm that the building has suffered no structural damage.

This type of practical automation of city services is the basis of the Urban OS – a system of networked sensors, cloud-controlled middleware and simple user interfaces that could represent the future of cities worldwide.

The Urban Operating System (UOS) is the work of Living PlanIT, a technology company whose partners include Microsoft, McLaren and Cisco. Its aim is to reduce waste, improve safety and enhance quality of life for its residents.

UOS takes its cues from mobile operating systems like iOS and Android, with small programs called PlaceApps controlling functions within the city – everything from street lighting and traffic management to domestic appliances. These apps will be accessible from a wide range of devices, including smartphones and wall panels.

Officer at Living PlanIT, "The app principally consists of a few service calls and then you have a pretty thin binding to the actual device that consists of some appropriately styled elements, and whatever validation is needed for buttons or fields. The rest of it is all done by services at the back end."

Stenlake and his team have already developed a PlaceApp for fire detection and evacuation management. "The application uses many sensors in the building that might be sensing temperature," he says. Some of the sensors appropriately

PlaceApp security

Urban PlanIT is developing a bank of PlaceApps for Urban OS, but the company plans to publish its API so everyone from partners like Microsoft to self-taught bedroom coders can try their hand at PlaceApp development and even sell their creations in a virtual store.

With the Urban OS and its apps permeating every aspect of city life, we asked John Stenlake what the company

was doing to avoid compromising residents' security and privacy.

"In the general case, I don't think there will be a lot of data that actually persists on the device, and anything that does persist we can encrypt, so quite honestly I don't think there's a huge security problem there," he told us. "Obviously security and privacy is really important, and so all of the APIs require authentication, and there are

authorisation levels by role and by identity for any call that you want to make against those APIs.

A lot of these things end up being contextual, so for example you would be able to remotely control certain things in your apartment from your smartphone, but you wouldn't be able to do it with your friend's apartment – not even if you were standing in it, unless your friend had granted you those permissions."



▲ Living PlanIT is using a modular design for its buildings and OS.



▲ The first buildings based on the Urban OS are being built in Greenwicz and in PlanIT Valley in Portugal. There is also a project underway in Birmingham.

embedded in structures can be good up to 400°C, so even in a fire they work for a long time before it gets too hot for them to handle the situation, thereby providing a lot of very useful information about what the problem is, where it's happening and how it's spreading."

Urban OS in the UK

Living PlanIT is building a test bed for the Urban OS in Portugal (PlanIT Valley), but the technology could arrive here first. "It's quite likely that the first buildings our technology goes into will be in Greenwicz,"

says Stenlake. "One of our partners is Quintain Estates and Development, which is a very forward looking developer. Adrian Wyatt, their CEO, is a real visionary who had figured out the need for some of this stuff before we came along, and it was very much a meeting of minds. They have new developments going on around Greenwicz peninsula, around the O2, in association with Lend Lease. We're very much looking forward to that – we think that will just bear the first buildings in PlanIT Valley out of the ground." **PCP**



▲ The operating system will work best in new buildings with the necessary infrastructure already in place. Conversion of older buildings is less viable.

SOCIAL MEDIA

Safety at home

How developers' personal experience is informing city-wide software creation

Living PlanIT has built and demonstrated an app that controls the temperature and depth of water as it flows into a bath. That might seem like a strange use of a city-wide operating system, but the application is close to the heart of one developer, whose mother was badly scalded as a child by climbing into a bath and turning the hot tap on full.

The app lets users set profiles for different people. John Stenlake gave the example of a child's profile, which could be set to run a cooler, shallower bath than that for an adult. It also prevents the bath from overflowing, helping to avoid water damage to the building that can lead to costly repairs. There would be safeguards in place to prevent children activating the bath, but cold water is always run first to eliminate the possibility of a person being scalded.

The app also has an environmental purpose, reducing energy consumption. "If you look at the way people run baths," says Stenlake, "Typically they'll blend the hot and cold water until they've got a comfortable temperature, then they'll put the plug in. In the meantime of course you're losing a lot of energy because you're taking clean water and degrading it by putting it into the drains. It could be no better than grey water at that point unless it's treated again. So environmentally, that's not a good thing to do. It's far better to know what the temperature of the water is as you fill it, and to use smart control of the water as it comes in get the bath to the level and temperature you desire using the minimum amount of energy. So you have a smart control profile that says 'The cheapest way to do that is this amount of hot water and this amount of cold', taking into account how hot and how cold it happens to be today."

Another developer suggested that it should be possible to set your bath to run while you're on your way home from work, and this has also been implemented. See p18-19 for more on connected car technology. ■



▲ Safety controls will be part of the hardware and software in each building, protecting its occupants from unnecessary risks.

Bottom line...

▲ The value of virtual currency Bitcoin has dropped from a \$33 high in August to below \$2 as the cost of 'mining' the coins falls below the real-world exchange rate. The currency experienced a spike in value earlier this year due to speculative interest that has since dwindled.

▲ Apple has reported profits of \$6.62 billion for the third quarter of 2011. This was a \$2 billion increase from the same period last year, but analysts' predictions had been higher. This is the first time in four years that Apple's results have been below analysts' predictions.

▲ Symantec says it has found a piece of malware that could be 'a precursor to a future Stuxnet-like attack'. The worm, known as Duxup, contains elements of Stuxnet, but Symantec says it is not aimed at industrial control systems and can't self-replicate.