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Case study: Intrinsyc puts Microsoft's feature phone software to the test

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Platform providers have the feature phone in their sights

As the capabilities of mass-market feature phones continue to improve, this segment is becoming more and more compelling to the would-be platform providers. The scalability of the (largely) proprietary platforms developed by the handset manufacturers themselves is being stretched to breaking point and replacements are now being sought. However, what is far less clear is which of the many possible alternatives will be most able to achieve the best compromise between low costs (to the manufacturer) and high functionality.

Symbian and Linux-based platforms are re-orienting towards the feature phone market, while newcomers (at least as platform providers) such as Esmertec, TTPCom and SavaJe are targeting sub-segments of what is already a very large and rapidly expanding space. We forecast a total market for feature phones of 508.4 million units in 2005, rising to 853.9 million units in 2009.

Now Intrinsyc Software International has entered the fray, revealing to Ovum an aggressive roadmap for devices based on its feature phone software platform (code-named Polaris), which is itself based on Microsoft's Windows CE. If successful, the Vancouver, Canada-based handset systems integrator – and now product developer – expects to see Polaris providing the software foundations for five or six discrete mobile phone designs from different manufacturers by the end of 2006.

However, the real point of Polaris may be to demonstrate Windows CE's – and by extension Microsoft's – credentials as a contender in the simmering debate about how best to replace existing mass-market handset OSs. It could even persuade Microsoft itself to enter the firmament and put greater heat on Symbian to make its own offering more flexible.

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The feature phone platform dilemma

Proprietary handset platforms, such as Nokia's Series 40 and Motorola's Synergy, often have their origins in industrial-style realtime operating systems (RTOSs). While that allows them to extract the maximum potential out of the available hardware MIPS – for instance, it is still noticeable to end users that a high-end Nokia Series 40 device typically outperforms more powerful S60 hardware – the architecture of these platforms is far from optimal for today's feature phones.

The high number of dependencies between applications and services that are common in these platforms, and are an important factor in their performance, are a liability in terms of platform scalability. Near-constant hardware and services advances are forcing handset manufacturers to write considerable amounts of custom code almost every time they bring up a new device. That is not only affecting them in terms of increased development costs and resources, it is increasingly affecting their ability to bring new devices to market quickly.

Numerous third parties have spotted an opportunity to supply alternatives to manufacturers that either lack the desire or the skills to re-develop their proprietary platforms from the ground up. These have all been designed to reach a good compromise between handset bill of materials (BOM) and time to market, and all tend to feature modular, and therefore much more scalable, architectures.

Although Nokia and Motorola have set themselves on course to replace, in time, their own feature phone platforms with more scalable alternatives, in the shape of Symbian and Linux respectively, around half the handset manufacturer market is potentially still open to these ISVs.

Windows CE's hidden charms

At first glance, it is easy to ask whether Windows CE is fit for this purpose. After all, Windows Mobile, itself based on Windows CE, is not renowned for its affinity towards lower-end CPUs and small memory footprints. Microsoft's own lack of interest in feature phones – as opposed to high-end smartphones – appears to reinforce this perception. The competition for third-party feature phone platforms is undeniably going to be fierce without the base platform carrying a significant hardware, and therefore a BOM, burden.

However, this perception ignores some inherent strengths that Windows CE offers experienced third parties – such as Intrinsyc – wishing to exploit the opportunity for flexible, scalable feature phone platforms that keep a close eye on minimising the total BOM (hardware and software).

Most obviously, it is important not to confuse Windows CE with Windows Mobile. Windows Mobile (in its various guises) provides complete platforms for high-end mobile devices. Windows CE, by comparison, provides a highly componentised toolkit, centred on Microsoft's user-friendly visual development tools, Platform Builder and Visual Studio.

From this basis, third parties can build software platforms for a wide range of embedded devices, not just handsets or media players. Licensees are at liberty to choose which components they want to use, for which Microsoft is compensated accordingly.

Crucially, they are also free to add in their own components and, under Microsoft's most flexible licence, they can also make changes to the Windows CE source code and kernel. This is exactly what Intrinsyc has done. Polaris's kernel is said to be only one third the size of the off-the-shelf Windows CE version, with consequent reduction in memory footprint. Intrinsyc claims that workable Polaris handsets can be built using a 100MHz CPU and 12MB ROM/12MB RAM memory footprint, which appears extremely competitive with alternatives.

On top of this, the company has pulled together a full rake of typical handset applications from the CE toolkit, its own developments and from selected partners (a full HTML browser is a notable omission from Intrinsyc's publicity material, however).

Add in Intrinsyc's own, well regarded, telephony software stack and Polaris-specific SDKs (which plug into Microsoft's tools environments), including an easily customisable user interface framework that extends across all applications on the phone, and the potential of Polaris (or Windows CE more generally) as a feature phone platform becomes much clearer.

If it's good enough for Intrinsyc…

Polaris's simple architecture should appeal to handset manufacturers while its user interface customisability should additionally appeal to mobile operators. Polaris is not intended to be 'open' – in the sense of offering a platform that enables end users to install additional native applications after they have purchased their device. However, its Windows CE core makes it relatively straightforward to port existing Windows Mobile applications to the platform for embedding at build time, or indeed to build new ones.

Phones with specific highlighted features, such as gambling or, perhaps (and this is pure speculation) a travel application along the lines of the well known WorldMate, then become possibilities without incurring fundamental changes to hardware or software integration.

All of these factors contributed to Intrinsyc's choice of Windows CE for Polaris over alternative OSs. Symbian, for instance, is widely perceived as offering a technically superior OS for handsets (Intrinsyc itself is clear on this point), and the company has its sights firmly set on the mid market. However, unlike Microsoft, Symbian will not allow third parties to alter the software, and no true feature phone variant yet exists.

Then there's mobile Linux, which most observers agree has considerable potential once fundamental issues such as poor power management are finally overcome. Only then will it be ready for more widespread use in mass-market phones, rather

than as a left-field alternative to Symbian/Windows Mobile/Palm OS at the high end. Intrinsyc estimates that these problems will be overcome in the next 12 months, but doubts that Linux will boast the BOM advantages of Polaris, due to the considerable investment required to build a complete platform around a Linux core.

For an established mobile handset expert such as Intrinsyc – the company provided systems integration services for several early Windows Mobile phones and built the CDMA telephony stack for Symbian – Windows CE offered considerable flexibility, good tools and favourable licensing for a first foray into feature phone platforms. It also provided them a fast time to market. A preview of Polaris was shipped to prospective licensees in November; development of the platform only began in 2004.

However, those factors are also at the root of Intrinsyc's challenges going forward. In theory, any other company could (potentially at least) take Windows CE and make a mobile phone software platform from it. Some already have, among them handset minnows Neonode and Emblaze Mobile. Meanwhile, Motorola has used Windows CE as the base software platform for its CN620 combination cellular and voice-over-wireless LAN handset.

Others may yet be tempted, not least the handset manufacturers themselves, being keen to replace their proprietary systems. While Microsoft itself currently appears (publicly) uninterested in the feature phone arena, it is hard to believe that its gaze will not be diverted north over the Canadian border if Intrinsyc's ploy begins to gain market traction. A future acquisition by Microsoft is therefore not out of the question to bolster its mobile technology division. It has done such things before; for example, buying microbrowser developer STNC in 1999.

If Intrinsyc can meet its target of five to six handsets from different manufacturers that will be a considerable achievement for the company, if not enormously significant in terms of the total number of new handset models that will come to market in 2006.

However, the company's fate may be to prove the concept of Windows CE for feature phones, but for other, bigger and better funded companies to build it a market share.

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