

Talking the Java language

The Java Card Forum (JCF) was established in 1997 to meet the growing global requirement for smart card applications that would be interoperable across compliant manufacturer products. With concepts such as convergence and multi-media applications dominating the new world order of technology, Frédéric Leclef, business chair of the JCF, tells CTT what it means for Java Card products.

“In the ten years since we were formed, we’ve gone from a technology that wasn’t interoperable at all to one that dominates the smart card market.

Big step forward

“The Java Card platform has now reached version 2.x, but as a forum in collaboration with the specification’s owners, SUN Microsystems, we’re continuing to advance the technology so that Next Generation Java Card becomes an increasingly common component in the IT world. We’re currently working on a process that will enable the development of applications which can be run from different environments. This is a major step forward, marking a move away from the necessity to have a specialised ‘compressed’ smart card-based Java applet (CAP file). At present although the applications themselves are developed and run in an interoperable way they are still not fully interoperable with all the other platforms that Java runs on. And when we look at the many devices, such as mobile phones, pdas, smart phones, terminals and PCs and servers – which is where the language was developed – providing a development experience consistent with the standard for other Java devices, and enabling smart cards to leverage developer knowledge, experience, tools and mindshare is a big step forward. After all, the Java language was developed to work seamlessly by providing an object-orientated language for web communication. That’s where it’s been very successful and this is where Java Card technology can also be beneficial.

“So our next step is to continue the work of the past couple of years and develop recommendations to Sun Microsystems for specifications that reflect the demands of smart card technologies in what is rapidly becoming a convergent world. To achieve this, the Next Generation Java Card specifications will bring a new Java technology ‘engine’ (the Virtual Machine) to smart cards, with a level a functionality similar to what can be found on other mobile and embedded devices (phones, set-top-boxes, multimedia players and so on) . Additionally the specifications will allow standardised Internet protocol support and the capability to manage multiple applications running or opened concurrently. This therefore opens smart card technology up to the wider development world: for a start, more developers will have the opportunity to develop this technology because they won’t need to have specific smart card knowledge. It also means you are starting to allow greater, more seamless communication between the card and the device and vice-versa. So there will be less need for the devices – or the applications that are running on those devices – to have specific software to use the cards. That opens up a lot of opportunities enabling the development of a number of applications combined with security between the card and the device.

A strong link

“Taking this development into the Internet and wireless worlds, one of the big changes with Next Generation Java Card products will be the addition of a communication stack that supports TCP/IP IP protocols and therefore opens up the card to become a true webserver. It goes hand in hand with

other specification changes that the European Telecommunications Standards Institute (ETSI) is looking at, such as high speed protocols to standardise communication technologies. This is interesting for smart card manufacturers because it starts to give a much higher bandwidth for communication between the card and other environments and will allow larger amounts of data and programs to be personalised onto the cards in a faster manner. One of the benefits will be that smart cards will be able to play a more active part in a client or server role using standard protocols.

“Java Card technology is working to take its place in the newly convergent world of multimedia, Internet download and storage. The new generation of SIM cards also opens the door to new uses, such as contactless, storage and mobile TV. And all these applications require security and intelligence that will be controlled by the smart card. It’s these new uses that will enrich the user experience in the coming years – and Java Card technology can play a pivotal role.

Challenges of convergence

“Although the opportunities for Java Card technology are immense, there are challenges. For instance, we need to examine how to integrate new technologies such as high speed protocol and contactless technology, and we’re working with organisations such as GlobalPlatform and ETSI to address these issues.

“Another challenge is the sheer number of devices that Java Card-based technology could be deployed in. In the past, the technology was best known for its use in the GSM world, but we potentially have everything related to PC dongles, smart cards in an ADSL box or set-top box and smart cards in a machine-to-machine environment. So the market for the technology is now much bigger than ever before.

“And we also have to bear in the mind that as Java Card products evolve and are used more widely, the technology will also attract a bigger community of developers and range of applications. So what we have to work on is conferring the smart card the status of platform, so that it consolidates its position in this overall infrastructure.

“A huge part of end-user business has moved to an online world where all the entertainment and infotainment content is available online from a number of devices, and where people expect to be connected at any time and any place for both work and leisure. Being able to provide end-users with the entertainment experience they expect, an important part of the online world, is something we expect to deliver with Java Card technology-based smart cards via new applications and uses.

Moving beyond telecoms

“The Next Generation Java Card technology offers existing smart card applications more functionality and connectivity, particularly in the GSM sector. But if you look at what is happening beyond telecoms, for the very first time there is the opportunity to enter an area that standardised or interoperable smart card technology has never really been before – and that’s PCs: logging in and making secure transactions over the Internet using a conventional PC.

“Furthermore, there are opportunities associated with using the card as an identifier. And the latest version of Java Card technology removes the requirement to have lots of firmware which has often

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limited the introduction of smart card authentication on existing platforms such as PCs, because you usually had to have some form of specific hardware, firmware or software.

“In turn, this could give a lot more confidence to other industry sectors in the IT arena. I think this is an area where we can see growth. Potentially the card could be an identity organiser, so that if it’s been issued by one authority it can be used by another – provided business and legal relationships can be established.

“This could be the time when the smart card comes of age. It won’t be an isolated system component. It’s going to be valued for some of the more fundamental things it can do very well. And it’s always been able to do these things – but now it’s going to get the chance to do them in a more ‘open connected world’.”

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