

COMPANY PROFILE

& Overview of MULTOS TECHNOLOGY



- ➔ EMV Migration
- ➔ Government ID
- ➔ Contactless Technology
- ➔ Secure Internet of Things (IoT)

Multos International is a leading provider of technology and solutions for the smartcard and smart device industries, offering a comprehensive range of highly secure MULTOS products designed to meet the specialised needs of financial and government card issuers and secure device developers.

Market Focus:

- › Financial: EMV migration for all payment brands (Global, regional, local), contactless, biometrics, authentication, loyalty, transit multi-function, wearable and mobile payments
- › Government: national e-ID, e-Health, PKI, biometrics, e-Passport
- › Smart connected devices: embedded systems requiring real security at the endpoint

Expertise:

- › Development of secure operating systems, payment and identity applications
- › EMV migration consulting and technical support
- › Smartcard and security technology
- › Certificate Authority solution for EMV, PKI, NFC and MULTOS



INTRODUCTION TO MULTOS TECHNOLOGY

The core functions of smart secure devices, namely reliable security, cryptographic functions, and the ability to process information, requires particular attention to the underlying technology platform. Added to this is a desire to maintain control and enhance the applications that reside on this secure environment by chip card issuers, whether they are financial institutions or governments, and providers of smart devices or tokens.

MULTOS was designed to meet these core objectives.



The MULTOS Framework

More than just an operating system, or a set of APIs, MULTOS is an **open, high security, multi-application platform**, defining a complete provisioning environment. Each of the constituent elements and processes is designed and implemented to ensure the Issuer, or their assigned personalisation bureau, is in control over the smartcard or smart device lifecycle. This is entirely contained within the MULTOS specifications and thereby does not rely on external or supplemental standards.

The MULTOS Secure Device

Each MULTOS implementation is developed on secure silicon chips and offers a platform for multiple applications to securely co-reside and execute. The MULTOS specification covers the card operating system, application programming interfaces (APIs), and card application lifecycle management for securely loading or deleting only authorised applications using cryptographic methods.

The MULTOS specifications offer a choice of card key management mechanisms, either using public-key methods from a central CA (root of trust) for MULTOS devices, or using symmetric key methods injected at the bureau for MULTOS or MULTOS step/one devices. Both support the same MULTOS commands, so applications can execute on either platform (except for RSA functions).

MULTOS applications are the most efficient in the industry. Along with off-the-shelf applications, an application development tool is available free of charge enabling development in 'C', Java, or a highly efficient low level language (MEL).



Ensuring Confidence

Designed from the ground up as a high assurance security platform, the MULTOS architecture is specifically targeted for the limited resource environment of a smartcard or secure endpoint device, and offers what no other technology platform can. No other secure chip platform can match the security credentials of MULTOS technology, having achieved Common Criteria EAL7. Other unique features include:

➔ Security Architecture

- **Complete isolation between applications** » application's data space is allocated at load time
- **Integrity checking during runtime** » most secure virtual machine in the industry and does not rely on external tools
- **Patented key management** » offers the highest security and flexibility for loading applications and maintaining separation between application providers, card manufacturers, bureaux and card issuers.
- **In-Field device management** » efficient and easy to implement even over unsecured networks such as the internet.

➔ Interoperability & Supply Chain Management

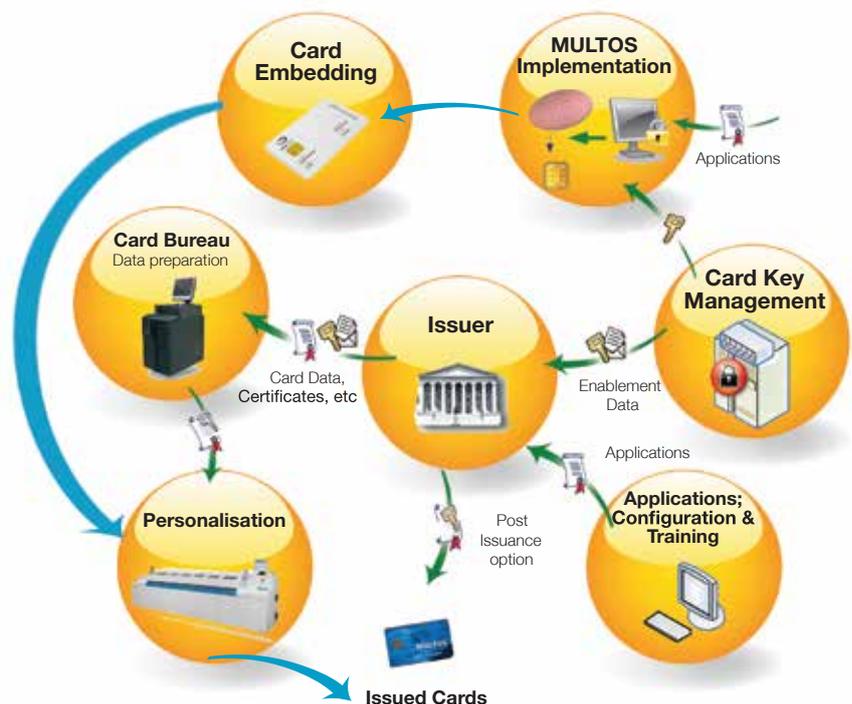
The truly open nature of MULTOS results in the industry's easiest supply chain management, with all aspects of the smartcard lifecycle covered, from application development through to device provisioning. Along with a Type Approval process, such commonality provides unparalleled interoperability and therefore independence in product sourcing and vendor selection. MULTOS customers can utilise multiple vendors right across the supply chain, including chip suppliers, card embedder or personalisation service; all achieved at the lowest total cost and minimal impact to operations.

Secure Provisioning

At the heart of the MULTOS lifecycle is the Issuer or their authorised card bureau, utilising the security and independence of either the centralized MULTOS Key Management Authority or the on-site key management utility C3.

Key Management: Creates the MULTOS cryptographic components that link the issuer to each unique MULTOS card. This includes the enablement data and the application digital certificates used by the OS to control loading or deleting permissions. And in a first for the industry, using the Real-Time Enablement (RTE) feature, this step can now be done live, in a single step during personalisation.

Personalisation: MULTOS supports a unique off-card data preparation model, allowing applications to be fully prepared before the physical device is presented to the equipment. The application is packaged into an ALU (Application Load Unit) and along with the ALC (Application Load Certificate) is then loaded onto the MULTOS device.



COMPANY PROFILE

History

Multos International originated as the smartcard division of Australian company Keycorp Limited, a pioneer in the area of secure, multi-application smartcard technologies, working in the field since 1993. We were among the first organizations to join the nascent open standards groups of both the MULTOS Consortium and the JavaCard Forum in the 90's, and have subsequently become the world's prime supplier of MULTOS technology.

In 2008, Gemalto, the world leader in digital security, acquired Keycorp's smartcard business assets, to create Multos International, operating as a wholly owned subsidiary.

Our Business

Our core focus is on MULTOS technology where we provide modules, or chips, to over 50 card manufacturing partners globally. Our products are the choice of many of the world's leading financial institutions, system integrators and government-issued identity programs. For 20 years we have supplied these markets with products based on MULTOS - the world's most secure, multi-application smartcard operating system.

Our team includes development centres located in Australia, Singapore and the UK, and local sales and technical support offices dispersed around the world. We have collaborated with major payment schemes, financial issuers, processors, transit providers and government agencies to produce not only the MULTOS products, but also the applications and tools necessary to implement world-class smartcard installations. This includes projects with all the major payment systems such as MasterCard, Visa, Discover/Diners, American Express, Union Pay, JCB, as well as regional and local payment networks, retailers, fuel/fleet and e-voucher programs. The development and sales of secure smartcard technology is

supplemented by a technical support team that strives to provide the highest level of customer-focused technical and business support. These specialists are dedicated to ensuring customers receive timely support and training at every stage of their smartcard programs. The expertise of this group extends to technical consulting, specification development, EMV parameter best practice and training on all aspects of the smartcard ecosystem.

Products

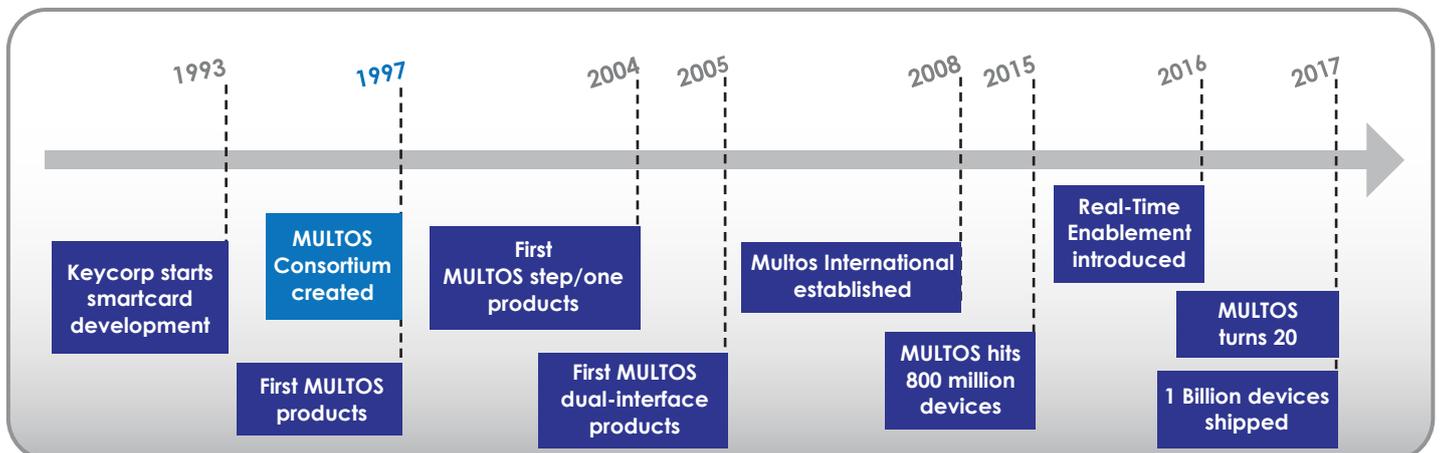
Our product mix is extensive, ranging from entry-level EMV products called MULTOS step/one, through to a wide selection of larger memory and dual-interface/contactless MULTOS products with numerous memory size options.

- MULTOS step/one (multi-app; SDA EMV; low-end ID)
- MULTOS (multi-app; DDA EMV; high-end ID)
- MULTOS dual-interface (multi-app; DDA EMV; ID; e-Passport), available in different packages
- New technologies such as biometrics and wearable payment solutions.
- Smart secure device solutions
- Applications for EMV, identity, PKI and more

Secure Services

StepNexus, a division of Multos International, develops and offers a range of secure key management solutions and services. This includes a range of Certificate Authority (CA) solutions covering MULTOS KMA, EMV CA, NFC CA, and generic PKI CA for industrial and distributed use-cases, suitable for securing Internet of Things (IoT) devices. Our secure facility operating in the UK for 20 years offers CA hosting services; or we can deliver the solutions as a software license to be installed and operated at a customer site.

20 Years of MULTOS



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