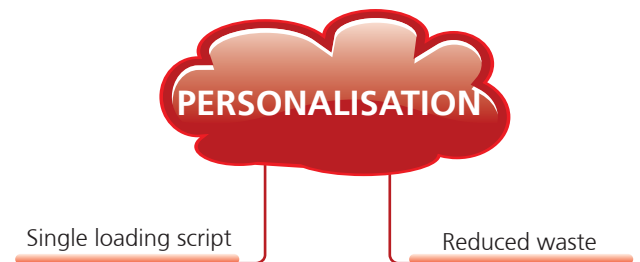


Designed specifically for the smart device market, the MULTOS scheme greatly simplifies many of the technical and commercial challenges that can be faced in any chip implementation.

## PERSONALISATION

Standardisation throughout the MULTOS Scheme delivers easy and economical personalisation.

MULTOS requires just one generic personalisation script to be sent to the personalisation machine. This is due to the previously mentioned “paste” mechanism of loading MULTOS data. With no keys or pre-perso profiles to load, the risk of wrongly pre-personalising cards is considerably reduced. Additionally, MULTOS application load certificates ensure that it is impossible to load corrupted data during device personalisation. As it is possible to reload MULTOS applications with a valid delete certificate, errors in issuer data can be quickly and easily corrected.



## What does this really mean?

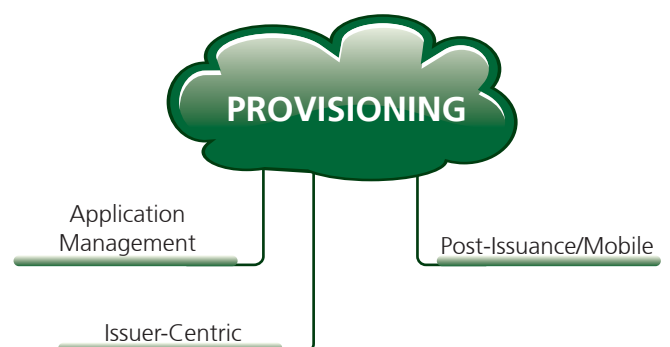
As new script development is not required for each new MULTOS product, setting up a new run for personalisation on MULTOS is easier, quicker and greatly reduces operational costs and resource requirements. This also has the added advantage of reducing costs associated with production errors (e.g. selecting the wrong script).

## Can you give me an analogy?

Say you want to complete a Loyalty card application form at a new coffee shop; you need to input the same fields every time even though the data is identical. MULTOS personalisation is like having one set of data for all stores, which just falls automatically into place with no additional input from you.

## PROVISIONING

All applications are personalised, loaded and deleted using exactly the same process, regardless of location. This holds true whether taking place in a central bureau, a 3rd party service provider, decentralised across multiple sites, instant issuance in the field, post issuance or in a mobile phone. The security, flexibility and ease of provisioning is unmatched. Applications are personalised off-line, making loading to the target device a simple “paste” operation to the target device. All decryption required for the load process is performed by the target device.



## What does this really mean?

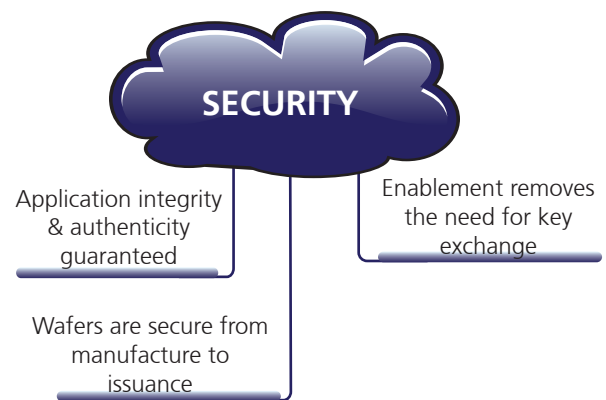
Only one data preparation process is required and only one loading script is required, regardless of the type and number of channels used for application deployment. For scenarios of post, instant or mobile issuance, complicated multi-party secure channel arrangements are not necessary, negating the requirement for HSM at the point of perso, or the need for a TSM over the entire provisioning process.

## Why is that important?

Not only does this make provisioning easier, it also reduces operational costs; key management and HSM usage, as well as providing a pathway to better exploit alternative delivery channels, such as mobile, instant and post-issuance. In addition to this, complexity can be costly; supporting multiple platform variations requires resources, both in terms of money and manpower. MULTOS does away with this by standardising and simplifying the provisioning process.

## SECURITY

All MULTOS devices are injected with unique, per device manufacturing keys into the silicon during IC manufacturer. Furthermore, "enablement" data contains a unique certified asymmetric key pair, generated for each device. Applications are signed using application provider key pairs and all public keys are certified by the MULTOS Key Management Authority (KMA).



## What does this really mean?

Unlike other technologies where every device on a wafer is protected by the same key, MULTOS secures each chip individually from the moment the wafer is injected. This means that modules can be shipped in this state without the need to perform additional key loading. The unique device key pair added during enablement makes key exchange and storage between silicon manufacturers, card manufacturers and personalisation bureaux redundant. Additionally, the card loading certificates generated by the KMA make verifying the authenticity of the target devices and applications a straightforward procedure.

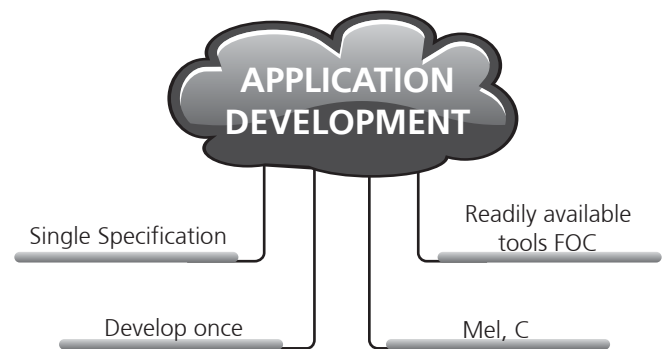
## Why is that important?

An Issuer can be assured the MULTOS product arriving to their customer has been protected from the moment it was created. Card manufacturers and bureaux can keep generic stock of parts without concerns of pre-perso or device keys locked to a certain customer – with MULTOS, only after enablement is a device uniquely locked to the issuer customer. The simple activation and loading procedure ensures that suppliers can reduce overheads, making the entire ecosystem a more efficient, straightforward and flexible solution for all parties involved.

## APPLICATION DEVELOPMENT

Writing applications for MULTOS was designed from conception to be a simple and straightforward process.

The whole MULTOS Scheme is based on a single set of Specifications. As all parties work to these rules, MULTOS ensures that an application, once developed, will work seamlessly on any MULTOS platform, regardless of implementer. Applications can be developed in standard 'C' programming language or MEL; the machine code specific to MULTOS. To assist the developer in their task there are all the tools necessary to build, debug and compile the new application, free-of-charge, readily available from the multos.com website. Additionally, free technical support is offered to developers via the multos.com developer forums



### What does this really mean?

'C' is a widely known programming language, making sourcing developers easy. As the application needs only to be written once to be able to run on any MULTOS platform, there are no redevelopment costs associated with building a MULTOS application.

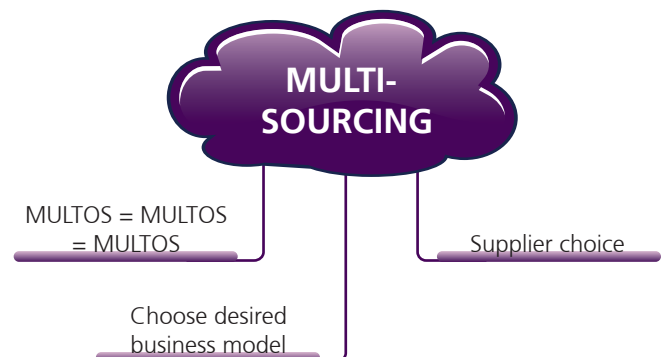
### Can you give me an analogy?

Buy a USB memory stick, insert it any laptop and PC and it will work with no fuss, regardless of PC or laptop manufacturer.

## MULTI-SOURCING

MULTOS is a truly open standard, governed by a Consortium of global industry leading companies, all who provide products and services across the lifecycle complying with the MULTOS specifications. These, along with a wide base of vendors across the world ensure a choice of suppliers for each stage of the process.

In accordance with these specifications, all new MULTOS devices have to go through a rigorous 3rd party Type Approval process before they can be certified.



### What does this really mean?

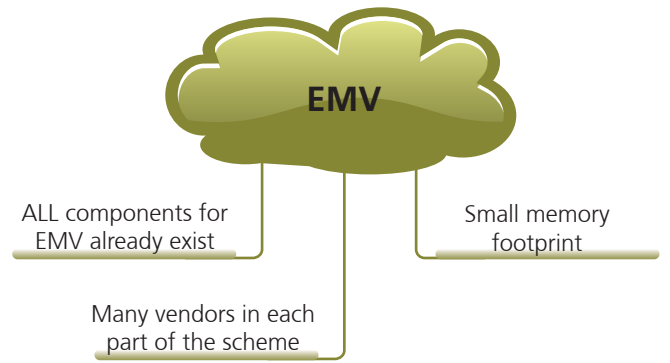
With MULTOS there are no incompatibilities between comparable products from different suppliers. It also means you can mix-and-match for your suppliers in the whole ecosystem. The Issuer or service provider is able to select the best combination of in-house development and external out-sourcing to best suit their individual business model.

### Can you give me an analogy?

Take a look at a coffee pod system. It's fine, if you like that kind of coffee, but you have no choice for the supply of pods – you are locked in. And by the way, you don't really have a choice with the coffee machine because the vendors have to pay a royalty. What if you could really choose the whole system yourself, from the machine, don't pay any royalties, choose your own coffee pod supplier, or perhaps even roast your own beans yourself in-house. That's MULTOS.

## **EMV**

MULTOS has a very mature EMV implementation portfolio. There are hundreds of EMV implementations worldwide, utilising MULTOS not only for all the major brands, but also for many regional payment schemes. The global nature of the Consortium means there are members who can provide rapid support and deployment for all the products and services required, including experienced and knowledgeable consultancy services.



### **What does this really mean?**

Selecting MULTOS as the platform for an EMV implementation allows the Issuer to benefit from the extensive maturity, security and simplicity provided by Consortium members and the product itself.