Moving from M2M to Iot

Role of Mobile Virtual operator

Operator agnostic SIM

Security on the SIM card

PrepaidM2M

Agenda

- Introduction
- M2M to IoT
- IoT solutions coming from a core mobile network
- Operator independency

Company introduction

Global Independent Carrier established, 2003

- 1000 Corporate Customers, Local & Global
- 170 people worldwide
- 6 Office Locations

Delivering Secure Managed Services

- 1.3m+ machines managed 200 countries
- 19 Mobile Operators Integrated
- Tier 1, 2 & 3 operational support 24/7/365 in-house

✓ Offices in Woerden, Boston, London, Geneva, Bonn and Raleigh-Durham

Established niche in Utilities in US and Europe

- Wyless and Aspider combined 2011 - 2014
- Proven Operator Independent Solutions (core)
- Smart SIM Card – unique future capabilities

✓ Reliable mobile data transfer & local Mobile Network Operators integrations in more than 200 countries

✓ Expertise and best practices gained from over over 10+ Years

Our References & Our Partners

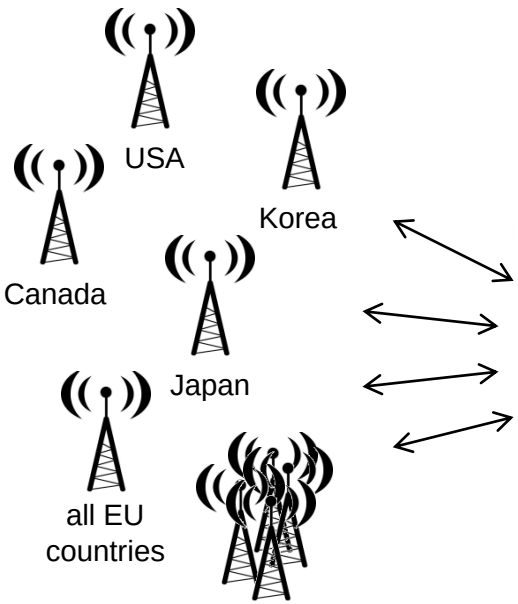
Corporate Customers

GE Lighting
STARBUCKS COFFEE
PHILIPS
BURGER KING
BOSCH Security Systems
STEDIN.NET
CITY OF HOUSTON TEXAS
elster EnergyICT
JPMorganChase
planet fitness
CARDIOCOM EXPERTS IN TELEHEALTH℠

Global & Local Partners

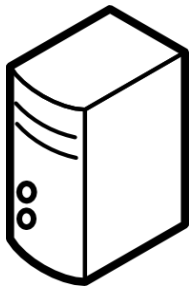
vodafone
SoftBank
kpn
jasper wireless
T-Mobile
amdocs
Telefonica
at&t

Mobile Virtual Operator ASPIDERM2M

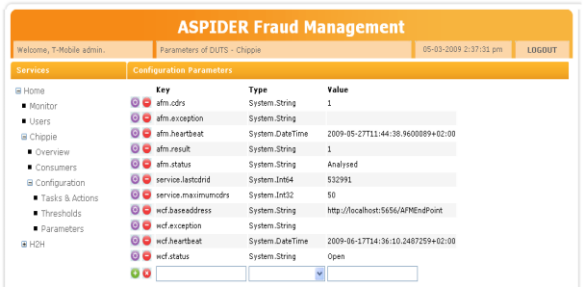


Total 60 countries. Multiple networks per country.

ASPIDER M2M provides a true global service:
1 Contract, 1 Contact, 1 Bill



Core Mobile Network
OSS/BSS systems



Partner Mobile Operators

We use <u>only</u> their Antenna's.

ASPIDER Solutions

Operates already 1.5mln SIM's

Legally considered a Mobile Network Operator
(operates company owned core-network & Operator Code)

M2M Customers,
MVNO's or high volume
OEM or ASP

Why IoT

Business Process optimization

Introducing new Business Model

New Service Offering/
New Revenue Streams

- Small to Medium Sized Enterprises' will generate the next 'wave' of growth
- Total Costs of ownership will go down dramatically
- End to end 'One Stop' shop offerings will become key

The Internet paradigm will be king!

Moving from M2M to IoT

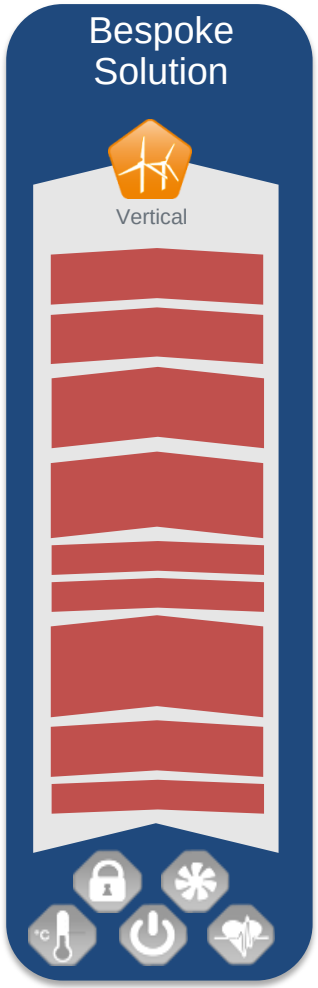
Exploiting The Role of Applications in the 'Internet of Things'

1. Shift From closed to open system

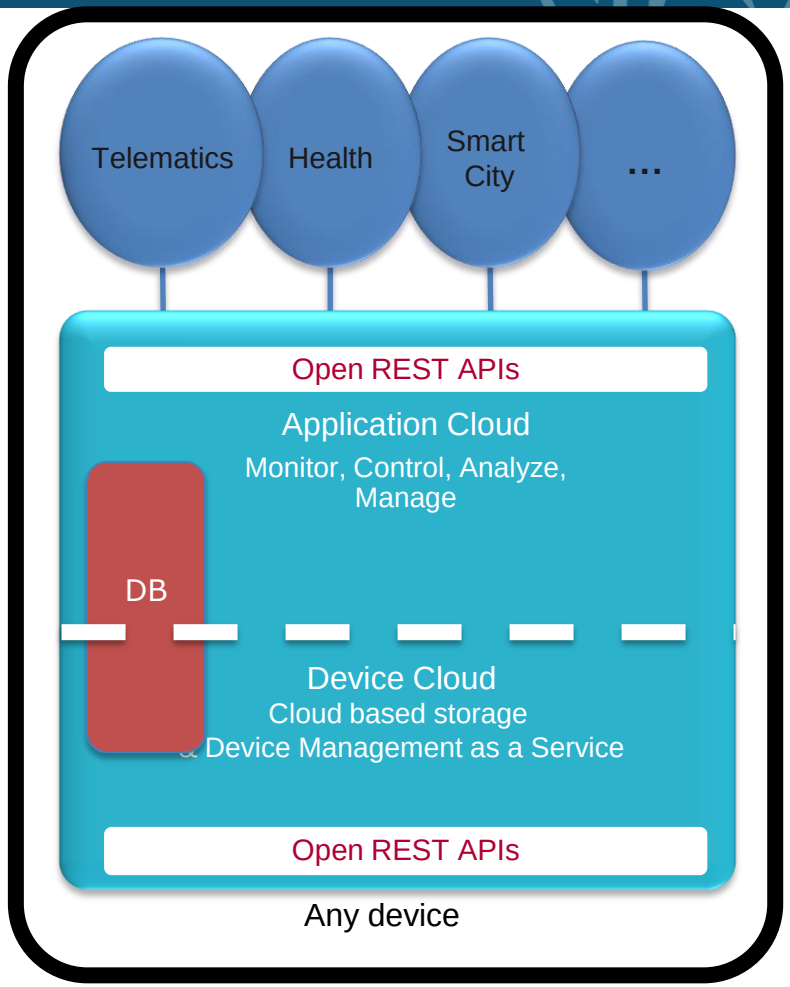
2. Enabling the Internet paradigm

Shift from closed to open system

From Closed System



Open System



… from system integration to plug & play

… from SW customization to SW products

Solutions coming from own Core

- PrepaidM2M
  - Ship your product with certified embedded connectivity, regardless of who will be the connectivity user
- SecureM2M
  - Secure key generation, distribution and management
  - Secure container for all types of keys on the SIM
  - Maintaining and adapting the level of security remotely via
    over- the-air
- Operator independence
  - Be independent from the mobile operators for your GSM based communication

Philips Citytouch

Stedin meetbedrijf

Operator agnostic SIM

Market needs

- My application needs optimal coverage, how can I achieve this?
- What happens if my operator does not extend its GSM license or stops supporting services I still need?
- A lock in is a bad starting point for discussions regarding quality or price improvements.
- I want easy, fair and clear mobile propositions. I do not want contracts, opaque offerings, difficult onboarding.
- I produce the M2M appliances and want to add the SIM card in the production line. I ship to multiple countries over the world
- I want to control the SIM to put applications or security codes on it for encryption and authentication

Possible solutions

- Becoming an operator with your own Mobile Network Code
- Subscription management (offered through an operator)
- MULTI-IMSI SIM (IMSI is unique identifier for the SIM)
- Using an IMSI from another country
- Using a satellite IMSI range
- Several combinations of the methods described above

Comparison

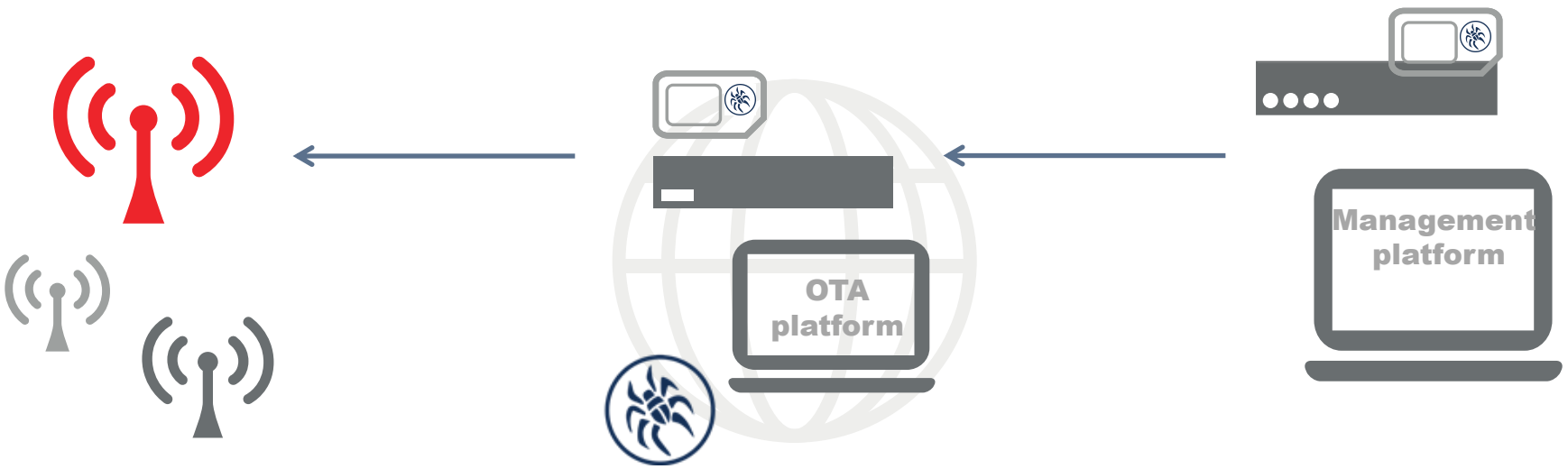
	Own MNC(%)	eUICC (%)	MULTI-IMSI (%)	Roaming IMSI (%)	Satellite IMSI (%)
Independence from operator	100	60	80	50	100
Independence from SIM vendor	100	20	100	0	100
Independence from Core network	50	50	25	0	50
Easy and transparent propositions	100	20	80	20	100
Costs	100	80	50	20	100
Coverage and uptime	100	60	100	100	100
Effort (how difficult in effort and time)	100	80	60	20	100
Proven method?	50	50	90	100	100
SLAs	100	100	100	50	50
Acceptance	20	40	80	90	60

Solution Footloose MULTI-IMSI

Radio Network

Core Network

Smart Card (SIM) + Service Delivery Platform

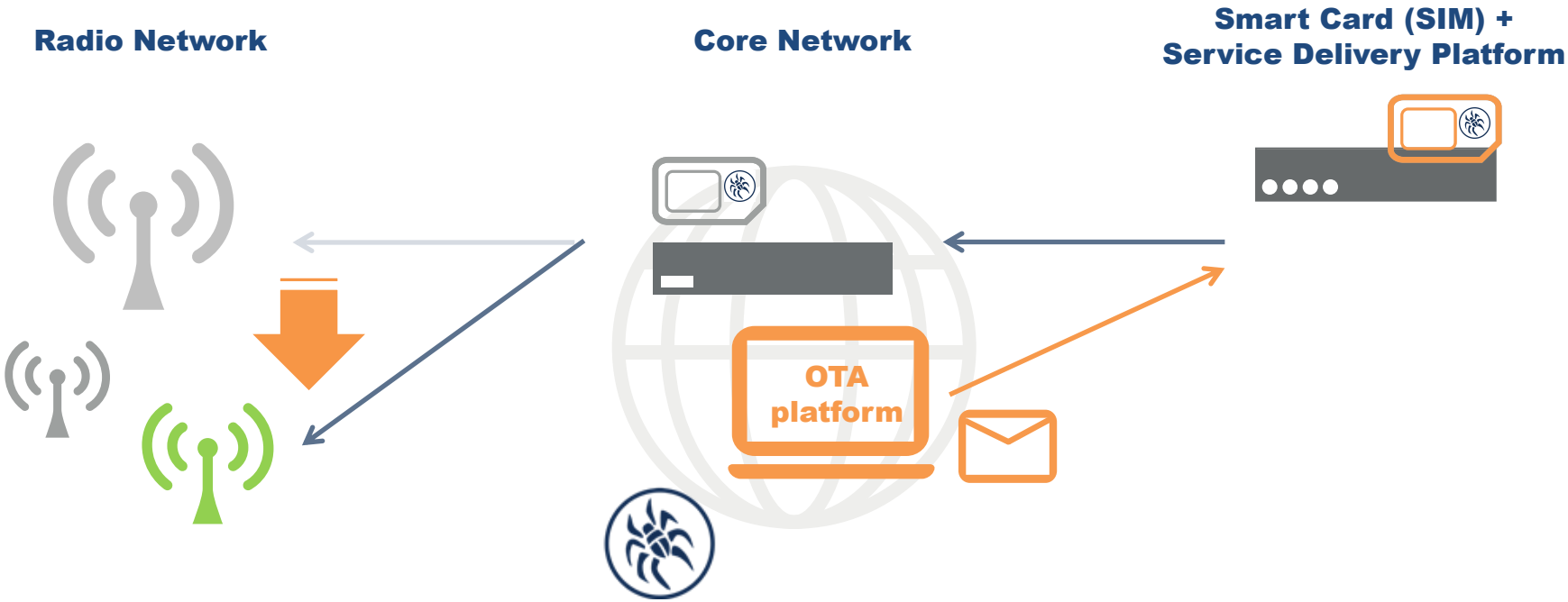


- ✓ Always the best coverage NL + int. networks
- ✓ Optimal lifetime 2G / 3G networks
- ✓ "last mile solution"

- ✓ One single configuration for all mobile networks
- ✓ Managing mobile networks remotely
- ✓ Solutions allows for combined local and roaming contract

- ✓ Multi M2M grade SIM with 10+ yrs lifetime
- ✓ SIM and network health monitoring tooling
- ✓ Award winning Service Delivery Platform supporting your operational processes

Radio network independency



- Change primary radio network without swapping SIM card
- Manage IMSIs remotely
- Change preferred and forbidden network list

Questions?

We are at your disposal:

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The Netherlands

Phone:
0624176316

Additional slides for download

Click & Connect

Easy access to M2M connectivity without a contract

Control your cost in real time

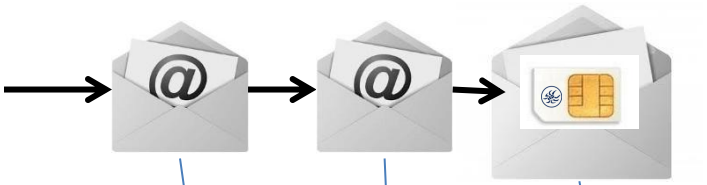
Benefit from aggressive pricing

Prepaid IoT/ A new Paradigm

Our promise

- Ship your product with certified embedded connectivity, regardless of who will be the connectivity user
- Integrated billing solution, which can be used for services and hardware
- Customers can activate and manage the embedded connectivity
- Earn money from connectivity without having the operational hassle
- No credit risk, cash-flow upfront
- Available as branded or as white label platform

End customer proces



OEM delivery:
- hardware
- SIM cards
- accompanying letter

Customer signs in on Website:
- Register SIM cards
- Creates account

email:
- Account confirmation
- Assigned SIM cards
- Initial balance

letter (optional)
- add. SIM card(s)
- Order key
- Activation code

email:
- Payment method acknowledgement
- Payment info

Easy account setup & order:

1. Register your SIM cards
2. Create your account
3. Select your payment method
4. Order additional SIMs (optional)

Outsourced billing

MyM2M

Develop device hardware + serices

Add:

- (optional-) connectivity
- (optional-) billing solution
- New ways of payment for hardware

Add

- Domain specific service

Pay for total solution in service contract

CnLaunch

Distributor
Value added Reseller

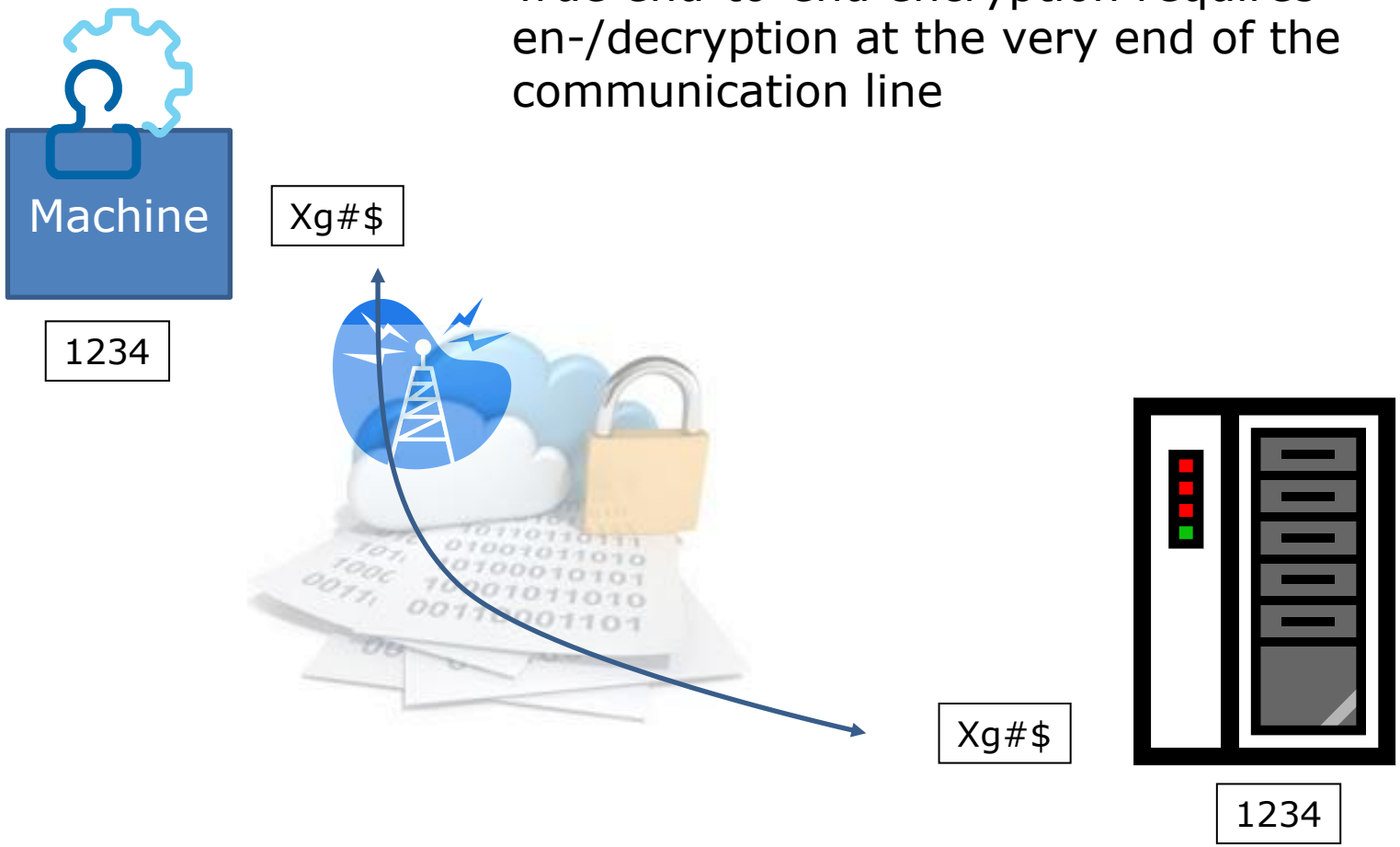
End customer

Secure M2M

Security on the SIM card

Which service should be secured?

True end-to-end encryption requires en-/decryption at the very end of the communication line



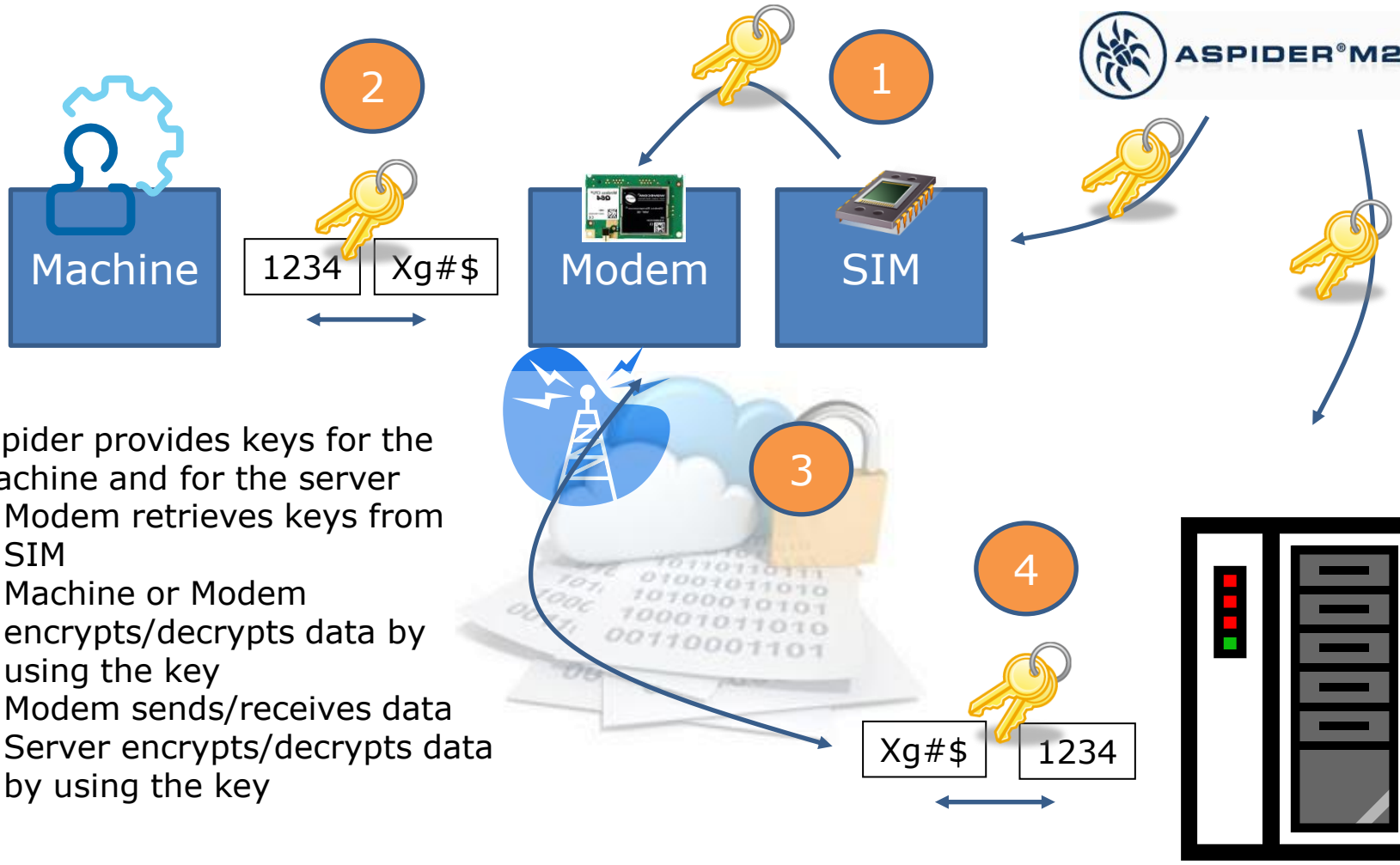
Enabling secure end-to-end security

- ✓ Aspider owned SIM cards
- ✓ Secure environment for the production of SIM cards
- ✓ Secure access to the SIM card via Over-The-Air (OTA)

Thus enabling

- Secure key generation, distribution and management
- Customer specific card configurations
- Secure container for all types of keys on the SIM
- Customer specific levels of security
- Maintaining and adapting the level of security remotely via over- the-air

Principal first level solution



Aspider provides keys for the machine and for the server

1. Modem retrieves keys from SIM
2. Machine or Modem encrypts/decrypts data by using the key
3. Modem sends/receives data
4. Server encrypts/decrypts data by using the key

Random Key in Transparent EF

The key is stored in a transparent file

- Aspider generates a key consisting of 512 random bytes.
- The key is stored in a transparent file.
- The Modem reads the content of this file using AT commands

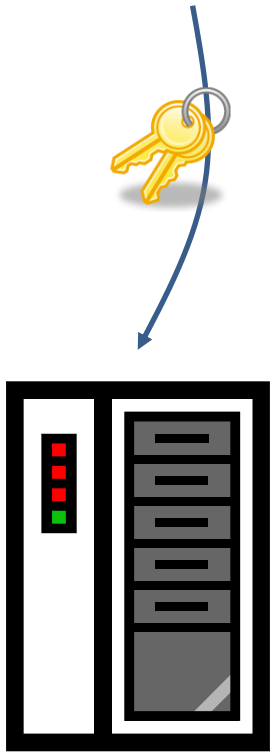
Random Key Output file

Aspider will provide a file for every SIM containing:

Batch information (header)
SIM specific variable data. 1 line per SIM

```
**************************************
*         HEADER DESCRIPTION
**************************************
Customer:      Aspider Solutions
Batch:         12345
Quantity:      5
Type:          DIM_xx_MFF2
Profile:       ASP_M2M_vx
**************************************
*         OUTPUT VARIABLES
**************************************
var_out : ICCID;E_Key
5020290000001650748;8F833A8C……..09D1E33E01F
```

Example

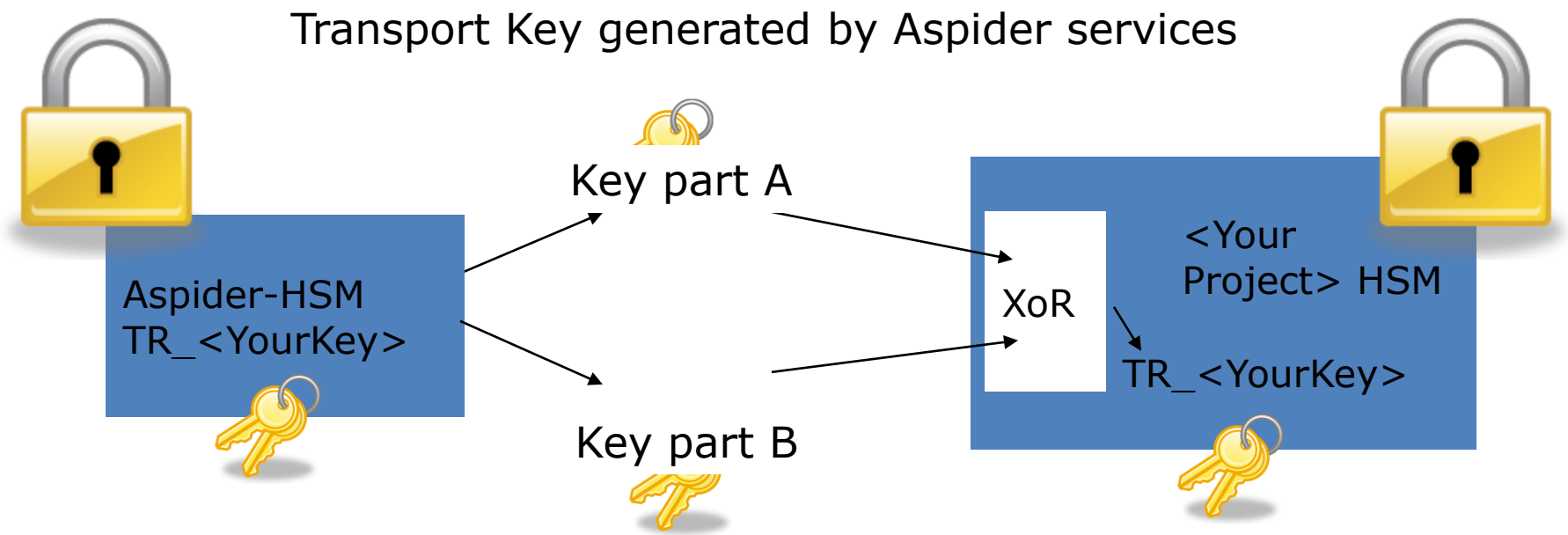


E_key would be the 512 bytes key encrypted with a Transport key

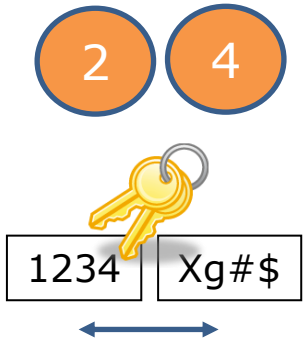
For encryption we use AES in ECB mode

Transport key

Aspider can provide the 128 or 256 bits AES transport key.
The key is divided in 2 or 3 parts and is send to Your key custodians.



Encryption/Decryption



Depending on the required level of security an aplett or code is to be integrated to encrypt/decrypt in your environment.

The applet or code will perform:

- AES encryption/decryption and
- optionally MAC calculation (encrypted cecksum)

Extendable to

- Authentication for retrieving keys
- Authenticity to ensure communication partners

Our services in a nutshell

- Secure provisioning of card specific keys in your required set up (number and type of keys)
- Provision of software for encryption and decryption according to your requirements (on request)
- Support for the integration of the software in your environment
- Development of more sophisticated solutions (key management, authentication, etc.)