payWave 2.1: Application migration

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1. Document Information

1.1. Evolution follow-up

Revision	Type of modification	Author	Date
1.0	Original version		[2010/10/13]
1.1	New "Get Processing Option", "MSD cryptogram type", "Internal Kernel modifications" and "qVSDC added constraints" chapters.		[2013/03/06]

1.2. Scope

The payWave 2.1 kernel allows performing both MSD and qVSDC payWave transactions.

This note explains how an existing application must be modified to perform a payWave 2.1 transaction as it did with the payWave 2.0.2 kernel.

2. Introduction

Main functionalities added between payWave 2.0.2 and 2.1 kernel :

- Dynamic Reader Limit allows the reader to apply different Reader Limit Sets for different card applications (even if they have the same AID), allowing the reader to vary Reader Risk Parameters on a transaction by transaction basis.
- Issuer Script Processing allows card application to be updated through issuer script commands. The cardholder is instructed to present their card once more, and Issuer Update Processing is performed to update risk management counters and indicators on the card, and/or to update card data elements.
- New transaction type management: refund, cash, purshase with cashback, etc.
- qVSDC reader support for the "Consumer Device CVM (mobil functionality).

Impacts on kernel interface could be summarized as follow:

- New tags,
- New values returned by the payWave_DoTransaction() function,
- New payWave_AfterTransaction() function,
- New parameters.

3. New Input tags

Some new tags must be added in the parameter file.

3.1. CVN 17 management (Cryptogram 17)

TAG_PAYWAVE_MSD_DISABLE_CVN17 (0x9F91831E)

If this tag is present and set to TRUE in the parameter file, CVN17 is not supported by payWave (MSD) kernel.

3.2. Transaction log

TAG_PAYWAVE_IS_TRANSACTION_LOG_SUPPORTED (0x9F918318)

If this tag is present and set to TRUE in the parameter file, transaction log is supported by payWave kernel.

3.3. Issuer Script (ISP)

TAG_PAYWAVE_ISSUER_SCRIPT_LIST (0x9F918316)

This tag must contain Issuer authentication data and scripts received from Issuer (format BERTLV).

3.4. MSD tags not managed

TAG_PAYWAVE_MSD_TAGS_NOT_MANAGED (0x9F91831A)

MSD list of tag to not managed in completion output buffer

3.5. qVSDCtags not managed

TAG_PAYWAVE_QVSDC_TAGS_NOT_MANAGED (0x9F91831B)

qVSDC list of tag to not managed in completion output buffer.

4. New Output tags

Some new tags can be used after a payWave transaction.

4.1. Issuer Script Result

TAG_PAYWAVE_ISSUER_SCRIPT_RESULT (0x9F5B)

This bit field indicates the result of Issuer Script Processing for a script.
Several tags may be supplied by kernel on the end of the process.

4.2. Terminal Entry Capability

TAG_PAYWAVE_TERMINAL_ENTRY_CAPABILITY (0x9F918317)

This tag indicates if terminal manage VSDC contact chip.

4.3. Transaction log

TAG_PAYWAVE_TRANSACTION_LOG_RECORD (0x9F918319)

Storage of a transaction log (coming from card) record.
Several tags may be supplied by kernel on the end of the process.

TAG_EMV_LOG_FORMAT (0x9F4F)

List (in tag and length format) of data objects representing the logged data elements that are passed to the terminal when a transaction log record is read.

4.4. ODA fail

TAG_PAYWAVE_ODA_FAIL (0x9F91831C)

Information set if transaction terminated is due to an ODA (Offline Data Authentication) error.

4.5. Declined by card

TAG_PAYWAVE_DECLINED_BY_CARD (0x9F91831D)

Information set if transaction terminated is due to the card response, AAC (Application Authentication Cryptogram).

4.6. Get Processing Option

TAG_PAYWAVE_GPO_FORMAT_1_USED replaced by TAG_PAYWAVE_GPO_FORMAT_USED (0x9F918301)

Set to :

- TAG_EMV_RESPONSE_MESSAGE_TEMPLATE_FORMAT_1 for GPO card response without tags and lengths
- TAG_EMV_RESPONSE_MESSAGE_TEMPLATE_FORMAT_2 for GPO card response with tags and lengths.

See Visa contactless specification 2.1.1 Req 5.57.

4.7. MSD cryptogram type

TAG_PAYWAVE_MSD_CRYPTOGRAM_TYPE (0x9F918304)

Set to cryptogram type value.

5. New value returned by payWave_DoTransaction() function

In case of Get Processing Option card command, a mobile phone response has been detected, the payWave_DoTransaction() function returns KERNEL_STATUS_MOBIL (0x011F) (defined in Common_Kernel_API.h). This error allows to restart a selection application cycle with new user message (for mobile phone)...

6. New payWave_AfterTransaction () function

This function allows to execute the "After" transaction step (Used for load Issuer Scripts).

Function definition:

```
int payWave_AfterTransaction (T_SHARED_DATA_STRUCT * pDataStruct);
```

Parameters:

param[in,out] pDataStruct Shared buffer used to exchange data with the kernel.

- Input data can be provided. It will replace each existing data within the kernel database.
- Output data are the same as payWave_DoTransaction() function (as it continues the transaction).

Returned Kernel processing status code:

- KERNEL_STATUS_OK if all the data are provided and no error occurred.
- KERNEL_STATUS_LACK_OF_MEMORY if there is not enough memory in *pDataStruct* to store all the tags.
- KERNEL_STATUS_DATABASE_ERROR if a database error occurred.
- KERNEL_STATUS_LIB_INTERFACE_ERROR: The payWave kernel is not loaded in the terminal (or an interface error occurred).
- KERNEL_STATUS_CARD_UNKNOWN
  - if SW2 card response is different from 0x00 in case of SW1 = 0x90.
  - if SW1 card response is different from 0x90, 0x62 and 0x63.

The returned value depends on the step executed.

7. New parameters

7.1. Dynamic Reader Limits (DRL) functionality

DRL functionality allows the reader to apply different Reader Limit Sets for different card applications (even if they have the same AID), allowing the reader to vary Reader Risk Parameters on a transaction by transaction basis.

The Application Program Identifier (Application Program ID) is the optional Visa proprietary card application data element that identifies the Reader Risk Parameters applicable to the selected application. The reader examines the Application Program ID returned by the card in the SELECT response and applies the corresponding Reader Risk Parameters.

7.2. Transaction type

PayWave 2.1 kernel allows to manage several transaction type.

The TAG_EMV_TRANSACTION_TYPE tag must be updated. It Indicates the type of financial transaction, represented by the first two digits of the ISO 8583:1987 : refund, cash, purchase, etc.

The TAG_EMV_AMOUNT_OTHER_BIN tag must be updated. In case of purchase transaction with cashback, this Secondary amount associated with the transaction representing a cashback amount.

7.3. Transaction log

The TAG_PAYWAVE_IS_TRANSACTION_LOG_SUPPORTED tag must be updated to inform kernel that terminal manages transaction log.

At the end of a transaction, if reader and card manage transaction log functionality, several TAG_PAYWAVE_TRANSACTION_LOG_RECORD tags have been stored in database. Each tags stored is a card data record.

7.4. Issuer Script processing

The TAG_EP_TERMINAL_TRANSACTION_QUALIFIERS must be updated with the Byte 3 bit 8 if the reader manages the Issuer Script Processing.

If reader manages ISP and if data has been received from Issuer in response of on-line authorisation (Issuer Authentication and Issuer Script Commands), the TAG_PAYWAVE_ISSUER_SCRIPT_LIST tag must be updated.

8. Internal Kernel modifications

8.1. Transaction flow

Two steps have been added for new functionalities implementation,

- STEP_PAYWAVE_READ_TRANSACTION_LOG : Transaction Log Management.
- STEP_PAYWAVE_ISSUER_SCRIPT_PROCESSING : Issuer Script Processing.

8.2. Error management

New errors range has been created:

- ERR_PAYWAVE_0000C4 to ERR_PAYWAVE_0000DC : Issuer Script errors.
- ERR_PAYWAVE_0000DD to ERR_PAYWAVE_0000E1 : AUC errors precisions.
- ERR_PAYWAVE_0000E2 to ERR_PAYWAVE_0000E9 : CVM errors precisions.
- ERR_PAYWAVE_0000EA to ERR_PAYWAVE_0000F0 : Transaction log errors.

9. qVSDC additional constraints

Visa Contactless Payment Specification, Version 2.1, May 2009:

- *5.11.1 qVSDC Path Processing chapter extract :*

  Acquirer-Merchant-Optional: The acquirer-merchant shall be able to enable and disable the supported CVMs. However, support for the Consumer Device CVM shall be enabled (TTQ byte 3 bit 7 is 1b).

Due to this mandatory point, Consumer Device CVM is managed by payWave 2.1.1 kernel and shall be enable in TTQ tag given in kernel input tags.

Several define allowing specifying fields in tags have been added. These field description bits are available for:

- TAG_PAYWAVE_TERMINAL_TRANSACTION_QUALIFIERS,
- TAG_PAYWAVE_CARD_TRANSACTION_QUALIFIERS,
- TAG_PAYWAVE_APPLICATION_PROGRAM_IDENTIFIER.