

Documento de Especificação Técnica - API APEX

Interface de Programação

Versão 3.1.0

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Modules

Here is a list of all modules:

- | | |
|---|--|
| API-APEX Core | |
| API-APEX Validation | |
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API-APEX Core

Functions

EXPORT ApexStatus CALL_CONVENTION Apex (void **outApexContext)	Creates the API-APEX Context. More...
EXPORT ApexStatus CALL_CONVENTION ApexDestroy (void **inApexContext)	Frees all memory allocated to API-APEX. More...
EXPORT ApexStatus CALL_CONVENTION ApexInit (void *inApexContext, ApexInitParameters *inInitParameters)	Initializes the API-APEX Context. More...
EXPORT ApexStatus CALL_CONVENTION ApexEnd (void *inApexContext)	Closes and frees all resources initialized during since the call of the last ApexInit() . More...
EXPORT ApexStatus CALL_CONVENTION ApexGetLibVersion (void *inApexContext, ApexVersion *outVersion)	Fetches both the API-APEX and API VIVA versions currently used. More...
EXPORT ApexStatus CALL_CONVENTION ApexGetFileInfo (void *inApexContext, T_S8 inFullFilename[K_APEX_FILE_PATH_MAX_SIZE], ApexFileInfo *outFileInfo)	Fetches the common data from the configuration file's header. More...
EXPORT ApexStatus CALL_CONVENTION ApexCheckConfigFiles (void *inApexContext, ApexCheckConfigFilesInputParameters *inputParameters)	Tests the input configuration files. More...
EXPORT ApexStatus CALL_CONVENTION ApexSetContext (void *inApexContext, ApexContextParamId inParamId, void *inParamConfig)	Changes or sets the operational context for the specified parameter. More...
EXPORT ApexStatus CALL_CONVENTION ApexSetCallback (void *inApexContext, ApexCallbackId inCallbackId, void *inCallbackPtr, void *inCallbackContext)	Changes or sets a specified API-APEX callback. More...
EXPORT ApexStatus CALL_CONVENTION ApexGetDetailedStatus (void *inApexContext, ApexLastError *outLastError)	

Fetches API-APEX error details. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexRead** (void *inApexContext,
ApexReadCardInputParameters *inputParameters,
ApexReadCardOutputData *outCardOutputData)
Reads the current card data. In case of a multi-application card, the read operation is performed over the currently selected application. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexGetCardBinaries** (void *inApexContext,
ApexCardBinaries *outCardBinaries)
Returns the card's binary data. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexCleanCache** (void *inApexContext)
Frees non essential memory. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexFreeData** (void *inApexContext, **ApexDataTypeld** inDataTypeld, void *inData)
Frees dinamically allocated memory for a given data type. [More...](#)

Detailed Description

Set of core API-APEX functions focused on initializing the library.

Function Documentation

◆ Apex()

```
EXPORT ApexStatus CALL_CONVENTION Apex ( void ** outApexContext )
```

Creates the API-APEX Context.

This function allocates memory for the API-APEX Context and initializes the logger in ERROR level.

Log level may be changed further by calling [ApexSetContext\(\)](#).

Parameters

outApexContext - Handle to the API-APEX Context, to be used in all subsequent function invocations.

Note

Example of API-APEX use steps:

1. [Apex\(\)](#);
2. [ApexSetContext\(\)](#); (May be called at any point after [Apex\(\)](#))
3. [ApexSetCallback\(\)](#); (May be called at any point after [Apex\(\)](#))
4. [ApexInit\(\)](#);
5. [ApexAddCardReader\(\)](#); (May be called a maximum of K_APEX_MAX_CARD_READERS times)
6. [ApexAddSamReader\(\)](#); (May be called a maximum of K_APEX_MAX_SAM_READERS times)
7. [ApexAddCardSamAssociation\(\)](#);
8. [ApexGetLibVersion\(\)](#); (Optional)
9. [ApexGetDetailedStatus\(\)](#); (Optional)
10. [ApexRead\(\)](#); (Optional)
11. [ApexValidate\(\)](#); (Optional)
12. [ApexEnd\(\)](#);
13. [ApexDestroy\(\)](#);

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_MEMORY_ALLOCATION_ERROR - unable to allocate the required memory.

See also

[ApexStatus](#), [ApexSetContext\(\)](#)

◆ ApexCheckConfigFiles()

```
EXPORT ApexStatus
CALL_CONVENTION
ApexCheckConfigFiles ( void * inApexContext,
                      ApexCheckConfigFilesInputParameters * inputParameters
                    )
```

Tests the input configuration files.

This function applies the same rules used during the initialization process (`ApexInit`) to the input configuration files and returns any error status found.

Parameters

inApexContext - Handle to the API-APEX Context.

inputParameters - Structure containing the names of the files to be tested and the required parameters to test them.

Returns

APEX Status code. Expected return values:

- `APEX_STATUS_NO_ERROR` - function ran successfully.
- `APEX_STATUS_CONTEXT_ERROR` - a NULL context was passed as input argument.
- Error relating to the parsing of the configuration file.

See also

[ApexFileHeaderInfo](#)

◆ ApexCleanCache()

EXPORT **ApexStatus** CALL_CONVENTION ApexCleanCache (void * **inApexContext**)

Frees non essential memory.

This function frees the memory allocated at some point during the execution of API-APEX functions that is not required no maintain a correct behavior. E.g. card seccion, the parameter `outCatalog` of [ApexGetCatalog\(\)](#), the parameter `inOutProductConfig` of [ApexConfigureProduct\(\)](#).

Parameters

inApexContext - Handle to the API-APEX Context.

Returns

APEX Status code. Expected return values:

- `APEX_STATUS_NO_ERROR` - function ran successfully.
- `APEX_STATUS_CONTEXT_ERROR` - a NULL context was passed as input argument.
- `APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR` - [ApexInit\(\)](#) has not yet been called.

See also

[ApexStatus](#), [ApexGetCatalog](#), [ApexConfigureProduct](#), [ApexGetInfracciones](#), [ApexGetFines](#)

◆ ApexDestroy()

EXPORT **ApexStatus** CALL_CONVENTION ApexDestroy (void ** **inApexContext**)

Frees all memory allocated to API-APEX.

This function must be called whenever API-APEX is no longer needed and only once. Calling this function without calling [Apex\(\)](#) beforehand or calling more than once for each [Apex\(\)](#) call, will result in undefined behavior.

Parameters

inApexContext - Handle to the API-APEX Context.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.

See also

[ApexStatus](#)

◆ **ApexEnd()**

EXPORT [ApexStatus](#) CALL_CONVENTION ApexEnd (void * **inApexContext**)

Closes and frees all resources initialized during since the call of the last [ApexInit\(\)](#).

This function closes all opened configuration files, disconnects all readers and ends the API VIVA.

Parameters

inApexContext - Handle to the API-APEX Context.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- Error relating to the closing of the API VIVA.

See also

[ApexStatus](#)

◆ **ApexFreeData()**

EXPORT [ApexStatus](#) CALL_CONVENTION ApexFreeData (void * **inApexContext**,
 ApexDataTypeld **inDataTypeld**,
 void * **inData**
)

Frees dinamically allocated memory for a given data type.

This function frees memory that was allocated by API-APEX (e.g. as the result of a function call) but which is not internally managed by API-APEX and thus is not automatically freed by ApexCleanCache or ApexEnd/ApexDestroy.

Parameters

inApexContext - Handle to the API-APEX Context.

inDataTypeld - Identifier of the type of data to be freed.

inData - Data to be freed.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.

See also

[ApexStatus](#), [ApexRead](#), [ApexControl](#), [ApexDecodeTransaction](#), [ApexGetLines](#)

◆ ApexGetCardBinaries()

```
EXPORT ApexStatus CALL_CONVENTION  
ApexGetCardBinaries( void * inApexContext,  
                     ApexCardBinaries * outCardBinaries  
)
```

Returns the card's binary data.

The binary data is read and stored in cache during the call to [ApexRead\(\)](#). Therefore, [ApexRead\(\)](#) must always be called before the call to [ApexGetCardBinaries\(\)](#).

Parameters

inApexContext - Handle to the API-APEX Context.

outCardBinaries - Output parameter containing all binary data from the last read card.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_NULL_PARAMETER - outCardBinaries is NULL.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_MISSING_CARD_READ - [ApexRead\(\)](#) has not yet been called.

See also

[ApexStatus](#), [ApexCardBinaries](#), [ApexRead](#)

◆ ApexGetDetailedStatus()

```
EXPORT ApexStatus CALL_CONVENTION  
ApexGetDetailedStatus( void * inApexContext,  
                      ApexLastError * outLastError  
)
```

Fetches API-APEX error details.

Parameters

inApexContext - Handle to the API-APEX Context.

outLastError - Output parameter containing all levels of error recorded by API-APEX.

Note

This function should only be called after another Apex function returns a status value different from APEX_STATUS_NO_ERROR.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.

- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - `ApexInit()` has not yet been called.

See also

[ApexStatus](#), [ApexLastError](#)

◆ ApexGetFileInfo()

```
EXPORT ApexStatus
CALL_CONVENTION
ApexGetFileInfo ( void * inApexContext,
                  T_S8 inFullFilename[K_APEX_FILE_PATH_MAX_SIZE],
                  ApexFileInfo * outFileInfo
                )
```

Fetches the common data from the configuration file's header.

Parameters

- inApexContext** - Handle to the API-APEX Context.
- inFullFilename** - File path and name to the configuration file.
- outFileInfo** - Data of the configuration file's header.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- Error relating to the parsing of the configuration file.

See also

[ApexFileInfo](#)

◆ ApexGetLibVersion()

```
EXPORT ApexStatus CALL_CONVENTION ApexGetLibVersion ( void * inApexContext,
                                                       ApexVersion * outVersion
                                                     )
```

Fetches both the API-APEX and API VIVA versions currently used.

Note

API VIVA version is only obtainable after APEX has been initialized (`ApexInit()`).

Parameters

- inApexContext** - Handle to the API-APEX Context.
- outVersion** - Versions currently used.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.

See also

[ApexStatus](#), [ApexVersion](#), [ApexInit](#)

◆ ApexInit()

```
EXPORT ApexStatus CALL_CONVENTION ApexInit ( void * inApexContext,  
                                              ApexInitParameters * inInitParameters  
                                              )
```

Initializes the API-APEX Context.

This function initializes and configures the API-APEX.

This function must be called before calling any other API function.

Parameters

inApexContext - Handle to the API-APEX Context.

inInitParameters - Structure containing all required parameters to initialize APEX.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- Error relating to the parsing of configuration files.
- Error relating to API VIVA initialization.

Note

By default [ApexInit\(\)](#) will only load to memory the configurations that are relevant to the operator selected. To load the configurations for all the operators found the APEX configuration mode should be set to APEX_CONFIGURATION_MODE_FULL by calling [ApexSetContext\(\)](#) before [ApexInit\(\)](#). If the APEX_CONFIGURATION_MODE_FULL is set, an initial operator must still be selected when calling [ApexInit\(\)](#) but it will be possible to change the current operator later by calling [ApexSetContext\(\)](#).

See also

[ApexStatus](#), [ApexSetContext](#), [ApexConfigurationMode](#)

◆ ApexRead()

```
EXPORT ApexStatus  
CALL_CONVENTION ApexRead ( void * inApexContext,  
                           ApexReadCardInputParameters * inputParameters,  
                           ApexReadCardOutputData * outCardOutputData  
                           )
```

Reads the current card data. In case of a multi-application card, the read operation is performed over the currently selected application.

This function reads the card's holder and environment details, the last event and its contracts. It can optionally read the loyalty data and the park event.

Note

When no longer needed the resulting **ApexReadCardOutputData** structure must be manually freed using **ApexFreeData()**.

Parameters

- inApexContext** - Handle to the API-APEX Context.
inputParameters - Input parameter that defines the function's behavior.
outCardOutputData - Output parameter containing all data read from the card.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Action lists checked according to the APEX configuration

Action List	List verified?
Card Blacklist	yes
SAM Blacklist	yes
Greylist	yes
Whitelist	no
Greenlist	yes

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_NULL_PARAMETER - inputParameters or outCardOutputData is NULL.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - **ApexInit()** has not yet been called.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function **ApexRead()** must be called again.
- Errors relating to card connection and card read.

See also

[ApexStatus](#), [ApexReadCardInputParameters](#), [ApexReadCardOutputData](#),
[F_CB_TransactionReport\(\)](#), [ApexFreeData\(\)](#)

◆ ApexSetCallback()

```
EXPORT ApexStatus CALL_CONVENTION ApexSetCallback ( void * inApexContext,
                                                    ApexCallbackId inCallbackId,
                                                    void * inCallbackPtr,
                                                    void * inCallbackContext
                                                    )
```

Changes or sets a specified API-APEX callback.

This function can change a callback based on its parameters.

Parameters

- inApexContext** - Handle to the API-APEX Context.
inCallbackId - Identifier of the callback that will be changed.

inCallbackPtr - Pointer to the callback function.
inCallbackContext - Execution context to be passed through the callback operations. NULL indicates that is not used.

Note

ApexSetCallback may be called before or after [ApexInit\(\)](#):

1. [Apex\(\)](#);
2. [ApexSetCallback\(\)](#); (OPTIONAL)
3. [ApexInit\(\)](#);
4. [ApexSetCallback\(\)](#); (OPTIONAL)

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.

See also

[ApexStatus](#), [ApexCallbackId](#)

◆ [ApexSetContext\(\)](#)

```
EXPORT ApexStatus CALL_CONVENTION ApexSetContext ( void * inApexContext,
                                                ApexContextParamId inParamId,
                                                void * inParamConfig
                                              )
```

Changes or sets the operational context for the specified parameter.

This function can change the context based on its parameters. Exemples: logger level, exploration period, etc.

Parameters

inApexContext - Handle to the API-APEX Context.
inParamId - Identifier of the part of the context that will be changed.
inParamConfig - Pointer to the data structure defined by inParamId.

Note

ApexSetContext() may be called before or after [ApexInit\(\)](#), depending on the value of inParamId.

1. [Apex\(\)](#);
2. [ApexSetContext\(\)](#); (OPTIONAL)
3. [ApexInit\(\)](#);
4. [ApexSetContext\(\)](#); (OPTIONAL)

Remarks

Parameter ID	Required data structure
APEX_CONTEXT_PARAM_ID_LOGGER_CONFIG	ApexLogConfig
APEX_CONTEXT_PARAM_ID_SERVICE_LOCATION	ApexServiceLocation
APEX_CONTEXT_PARAM_ID_SET_EXTERNAL_CARD	ApexCardDetectedInfo
APEX_CONTEXT_PARAM_ID_SET_CARD_TYPE_ID	T_S8 cardTypeId[K_APEX_CARD_ID]
APEX_CONTEXT_PARAM_ID_PERFORMANCE_CONFIG	ApexPerformanceConfig
APEX_CONTEXT_PARAM_ID_CONTROL_SERVICE_LOCATION	ApexControlServiceLocation
APEX_CONTEXT_PARAM_ID_CONFIG_MODE	ApexConfigurationMode

APEX_CONTEXT_PARAM_ID_CONFIG_OPERATOR	ApexOperatorConfig
APEX_CONTEXT_PARAM_ID_ACCESS_KEY	T_S8 key[K_APEX_ACCESS]

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_PARAMETER_ERROR - inParamConfig not recognized by APEX or invalid.
- APEX_STATUS_NULL_PARAMETER - inParamConfig is NULL (mandatory for some inParamI
- APEX_STATUS_INVALID_SERVICE_LOCATION - the service location contains an invalid inpu
- APEX_STATUS_INCOMPATIBLE_READER_CONFIGURATION - external card detection is no
- APEX_STATUS_INVALID_CARD_TYPE_ID - the cardType ID is not recognized by APEX.
- APEX_STATUS_INVALID_KEY - the key is not recognized by APEX.

See also

[ApexStatus](#), [ApexContextParamId](#), [ApexLogConfig](#), [ApexServiceLocation](#), [ApexCardDetector](#),
[ApexControlServiceLocation](#), [ApexConfigurationMode](#), [ApexOperatorConfig](#)



API-APEX Validation

Functions

EXPORT ApexStatus CALL_CONVENTION ApexValidate (void *inApexContext)	Validates a card using a contract or profile, taking into account the current location. More...
EXPORT ApexStatus CALL_CONVENTION ApexConfigurePreSelection (void *inApexContext, ApexConfigurePreSelectionParameters *inConfigurePreSelectionParameters, ApexPreSelectionConfiguration *inOutPreSelectionConfig)	Configures a pre-selection for a given contract. This pre-selection marks a contract to be used during validation and may include the selection of origin/destination zones. More...
EXPORT ApexStatus CALL_CONVENTION ApexPreSelection (void *inApexContext, ApexPreSelectionParameters *inPreSelectionParameters)	Writes the configured pre-selection on the card or on memory. More...

Detailed Description

Set of API-APEX functions focused on card/ticket validation.

Function Documentation

◆ ApexConfigurePreSelection()

```
EXPORT ApexStatus CALL_CONVENTION  
ApexConfigurePreSelection
```

```
( void *  
  ApexConfigurePreSelectionP  
  ApexPreSelectionConfigurati  
)
```

Configures a pre-selection for a given contract. This pre-selection marks a contract to be used during va origin/destination zones.

The configuration of a product pre-selection is an one step process, thus [ApexConfigurePreSelection\(\)](#) parameters. In this case inOutPreSelectionConfig works as an output parameter, and the only relevant fi

- configurationId - to be used as input to [ApexPreSelection\(\)](#).
- isValid - flag indicating whether or not the selected contract was accepted for pre-selection.

The configuration of an Origin/Destination pre-selection is a multi-step process, thus it is required that [ApexConfigurePreSelection\(\)](#) times as the end user chooses the desired origin and destination zones. On the first call to [ApexConfigurePreSelection\(\)](#) should have all its fields set to 0, which will tell APEX to start a new pre-selection. By the end of this first filled with a valid configurationId along with an array of choices for the Origin zone and an array of choices currently selected origin zone). If APEX has a location defined by [ApexSetContext\(\)](#), a zone of said location to this first call to [ApexConfigurePreSelection\(\)](#), though it may be changed on subsequent calls. If the end user changes the destination zone [ApexConfigurePreSelection\(\)](#) can be called again, passing the same inOutPreSelectionConfig. However, it is important to note that the available destination zones depend on the selected origin zone. First, select the origin zone first, then call [ApexConfigurePreSelection\(\)](#) once again, and only then ask the user for input values of inOutPreSelectionConfig) and finally call [ApexConfigurePreSelection\(\)](#) one last time.

Note

The pointers to memory inOutPreSelectionConfig.originZoneArray and inOutPreSelectionConfig.destinationZoneArray should not be changed nor freed.

This function uses cached data in order to provide the available origin and destination zones. There is a function, in order to guarantee that the correct data is being taken into consideration. This feature can make the operation faster, avoiding an unnecessary card read, because [ApexRead\(\)](#) is very likely to already know the contract number to choose as input (inConfigurePreSelectionParameters.contractNumber).

Parameters

inApexContext	- Handle to the API-APEX Context.
inConfigurePreSelectionParameters	- Input parameters.
inOutPreSelectionConfig	- Current pre-selection configuration.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_MISSING_CARD_READ - [ApexRead\(\)](#) was not successfully called.
- APEX_STATUS_INVALID_CONTRACT_NUMBER - inConfigurePreSelectionParameters.contractNumber is not a valid contract number.
- APEX_STATUS_INVALID_CONFIGURATION_ID - inConfigurePreSelectionParameters.configurationId is not a valid configuration ID.

See also

[ApexStatus](#), [ApexConfigurePreSelectionParameters](#), [ApexPreSelectionConfiguration](#), [ApexP](#)

Use example of a contract pre selection:

```
ApexConfigurePreSelectionParameters configurePreSelectionParameters;
ApexPreSelectionConfiguration preSelectionConfig = { 0 };

configurePreSelectionParameters.contractNumber = end user chosen contract
configurePreSelectionParameters.isODPreSelectionFlag = FALSE;

apexStatus = ApexConfigurePreSelection(apexContext, &configurePreSelectionP

if(apexStatus != APEX_STATUS_NO_ERROR || !preSelectionConfig.isValid) {
    Handle error
} else {
    ApexPreSelectionParameters confirmPreSelectionParameters;

    confirmPreSelectionParameters.APEX_PRE_SELECTION_MODE_ON_MEMORY;
    Copy preSelectionConfig.configurationId to confirmPreSelectionParameters

    apexStatus = ApexPreSelection(apexContext, &confirmPreSelectionParameter

    if(apexStatus != APEX_STATUS_NO_ERROR) {
        Handle error
    } else {
        success
    }
}
```

Use example of an Origin/Destination pre selection:

```
ApexConfigurePreSelectionParameters configurePreSelectionParameters;
ApexPreSelectionConfiguration preSelectionConfig = { 0 };

configurePreSelectionParameters.contractNumber = end user chosen contract
configurePreSelectionParameters.isODPreSelectionFlag = TRUE;

apexStatus = ApexConfigurePreSelection(apexContext, &configurePreSelectionP

if(apexStatus != APEX_STATUS_NO_ERROR || !preSelectionConfig.isValid) {
    Handle error
} else {

    do
    {
        ask the end user for their choice for origin zone based on preSelectionC
        fill preSelectionConfig.originZoneSelectedIndex with user choice
        apexStatus = ApexConfigurePreSelection(apexContext, &configurePreSelecti
    } while (!preSelectionConfig.isValid)

    do
    {
        ask the end user for their choice for destination zone based on preSel
```

```

fill preSelectionConfig.destinationZoneSelectedIndex with user choice
apexStatus = ApexConfigurePreSelection(apexContext, &configurePreSelecti
} while (!preSelectionConfig.isValid)

ApexPreSelectionParameters confirmPreSelectionParameters;

confirmPreSelectionParameters.APEX_PRE_SELECTION_MODE_ON_MEMORY;
Copy preSelectionConfig.configurationId to confirmPreSelectionParameters

apexStatus = ApexPreSelection(apexContext, &confirmPreSelectionParameter

if(apexStatus != APEX_STATUS_NO_ERROR) {
Handle error
} else {
success
}
}

```

◆ ApexPreSelection()

EXPORT ApexStatus
CALL_CONVENTION
ApexPreSelection (void * **inApexContext**,
ApexPreSelectionParameters * **inPreSelectionParameters**)

Writes the configured pre-selection on the card or on memory.

Before calling this function, **ApexConfigurePreSelection()** must be called to configure the pre-selection of a product.

If a pre-selection is written on the card, every validator will have access to it, while a pre-selection written on memory is only available on the machine that configured it.

Note

If **inPreSelectionParameters.preSelectionMode** is set to **APEX_PRE_SELECTION_MODE_ON_MEMORY**, the pre-selection will be used for the next validation only. Only one pre-selection can be written on memory at a time.

Parameters

inApexContext - Handle to the API-APEX Context.
inPreSelectionParameters - Details which type of pre-selection is going to be made and for which contract.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- **APEX_STATUS_NO_ERROR** - function ran successfully.
- **APEX_STATUS_CONTEXT_ERROR** - a NULL context was passed as input argument.

- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_INVALID_PRODUCT_CONFIGURATION - a valid configuration has not been set in advance using [ApexConfigurePreSelection\(\)](#).
- APEX_STATUS_INVALID_CONFIGURATION_ID - inPreSelectionParameters.configurationId is not recognized.
- APEX_STATUS_PARAMETER_ERROR - inPreSelectionParameters.preSelectionMode is not recognized.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexPreSelection\(\)](#) must be called again.

See also

[ApexStatus](#), [ApexPreSelectionParameters](#), [ApexConfigurePreSelection](#),
[ApexPreSelection](#), [F_CB_TransactionReport\(\)](#)

◆ [ApexValidate\(\)](#)

EXPORT **ApexStatus** CALL_CONVENTION ApexValidate (void * **inApexContext**)

Validates a card using a contract or profile, taking into account the current location.

Note

This operation invalidates any card data currently in cache.

Parameters

inApexContext - Handle to the API-APEX Context.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory
F_CB_ConfirmValidation()	Optional
F_CB_PostValidation()	Optional

Action lists checked according to the APEX configuration

Action List	List verified?
Card Blacklist	yes
SAM Blacklist	yes
Greylist	yes
Whitelist	yes
Greenlist	yes

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_INVALID_SERVICE_LOCATION - invalid or missing service location.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexValidate\(\)](#) must be called again.
- Errors relating to card validation.

See also

[ApexStatus](#), [F_CB_TransactionReport\(\)](#), [F_CB_ConfirmValidation\(\)](#), [F_CB_PostValidation\(\)](#)

Note

The application should call [ApexSetContext\(\)](#) to define the validation service location whenever the location is updated.

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API-APEX Control

Functions

EXPORT ApexStatus CALL_CONVENTION	ApexGetInfractionAttributes (void *inApexContext, ApexInfractionAttributes *outInfractionAttributes) Allows the caller to get the infraction attributes configured More...
EXPORT ApexStatus CALL_CONVENTION	ApexGetInfractions (void *inApexContext, ApexGetInfractionsInputParameters *inputParameters, *outInfractions) Allows the caller to get the infractions for the specified par
EXPORT ApexStatus CALL_CONVENTION	ApexGetFineAttributes (void *inApexContext, ApexFine *outFineAttributes) Allows the caller to get the fine attributes configured in AP
EXPORT ApexStatus CALL_CONVENTION	ApexGetFines (void *inApexContext, ApexGetFinesInputParameters *inputParameters, ApexFines *outFines) Allows the caller to get the fines for the specified parameter
EXPORT ApexStatus CALL_CONVENTION	ApexGetLines (void *inApexContext, ApexGetLinesInputParameters *inputParameters, ApexLinesInfo *outLinesInfo) Allows the caller to get the network lines for the specified parameter More...
EXPORT ApexStatus CALL_CONVENTION	ApexControl (void *inApexContext, ApexControlOutputData *outControlOutputData) Controls a transport card, taking into account the current location
EXPORT ApexStatus CALL_CONVENTION	ApexPaperControl (void *inApexContext, T_S8 inSecurityData[K_APEX_PAPER_TICKET_SECURITY_CODE], ApexControlOutputData *outControlOutputData) Controls an onboard ticket, taking into account the current location
EXPORT ApexStatus CALL_CONVENTION	ApexControlAck (void *inApexContext, T_S8 inTransactionId[K_APEX_TRANSACTION_ID_MAX_SIZE], ApexControlStatus inControlStatus, ApexControlFine *inControlFine, ApexDamagedCardInfo *inDamagedCardInfo) Confirms a control operation. More...

Detailed Description

Set of API-APEX functions focused on card/ticket control.

Function Documentation

◆ ApexControl()

```
EXPORT ApexStatus CALL_CONVENTION  
ApexControl( void * inApexContext,  
             ApexControlOutputData * outControlOutputData  
           )
```

Controls a transport card, taking into account the current location.

When no longer needed the resulting **ApexControlOutputData** structure must be manually freed using [ApexFreeData\(\)](#).

Parameters

inApexContext - Handle to the API-APEX Context.
outControlOutputData - Output parameter containing all data related to the control operation and its result.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Action lists checked according to the APEX configuration

Action List	List verified?
Card Blacklist	yes
SAM Blacklist	yes
Greylist	yes
Whitelist	yes
Greenlist	yes

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_INVALID_SERVICE_LOCATION - invalid or missing control service location.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexControl\(\)](#) must be called again.
- Errors relating to card control.

See also

[ApexStatus](#), [ApexControlOutputData](#)

Note

The application should call [ApexSetContext\(\)](#) to define the control service location whenever the location is updated.

◆ ApexControlAck()

```
EXPORT ApexStatus CALL_CONVENTION ApexControlAck ( void * inApexContext
                                                 T_S8          inTransactionId
                                                 ApexControlStatus inControlStatus
                                                 ApexControlFine * inControlFine
                                                 ApexDamagedCardInfo * inDamagedCardInfo
                                               )
```

Confirms a control operation.

A control transaction is generated, referencing the one generated during [ApexControl\(\)](#).

Parameters

inApexContext	- Handle to the API-APEX Context.
inTransactionId	- Control transaction ID. This ID is returned as the output of ApexControl() and is used as a means to control, i.e. has no card nor onboard ticket, this parameter must be present.
inControlStatus	- Final decision of the controller for the control operation. Only VALID and INVALID are valid values.
inControlFine	- Fine details. Must be present if inControlStatus is INVALID and NULL otherwise.
inDamagedCardInfo	- Damaged card info. This parameter is only used when an unreadable card is detected. This parameter is only used when inTransactionId is an empty string.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- Errors relating to card control.

See also

[ApexStatus](#), [ApexControlFine](#), [F_CB_TransactionReport](#), [ApexControl](#), [ApexPaperControl](#)

Use example of a card control:

```
ApexControlOutputData outControlOutputData;

apexStatus = ApexControl(apexContext, &outControlOutputData);

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
} else {
    ApexControlStatus controlStatus;
    ApexControlFine controlFine;
```

```

Show outControlOutputData and wait for the inspector decision on the val
Fill controlStatus with the controller decision

if (control results in an infraction) {
Search infraction and fine details
Fill controlFine
}

apexStatus = ApexControlAck(apexContext, outControlOutputData.transactic

if(apexStatus != APEX_STATUS_NO_ERROR) {
Handle error
}
}

```

Use example of a paper ticket control:

```

Initialize Apex

ApexControlOutputData outControlOutputData;

Read paper ticket security data from the ticket's QRCode

apexStatus = ApexPaperControl(apexContext, ticket security data, &outContro

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
} else {
    ApexControlStatus controlStatus;
    ApexControlFine controlFine;

    Show outControlOutputData and wait for the inspector decision on the val
    Fill controlStatus with the controller decision

    if (control results in an infraction) {
        Search infraction and fine details
        Fill controlFine
    }

    apexStatus = ApexControlAck(apexContext, outControlOutputData.transactic

    if(apexStatus != APEX_STATUS_NO_ERROR) {
        Handle error
    }
}

```

Use example of a damaged card control:

```

Initialize Apex

Attempt to control the card with ApexControl and determine that no card is

T_S8 transactionId[K_APEX_TRANSACTION_ID_MAX_SIZE];

```

```

ApexControlFine* controlFine;
ApexDamagedCardInfo* damagedCardInfo;

memset(transactionId, 0, K_APEX_TRANSACTION_ID_MAX_SIZE);

Fill controlFine;

Fill damagedCardInfo by manually inspecting the card.

apexStatus = ApexControlAck(apexContext, transactionId, APEX_CONTROL_STATUS

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
}

```

◆ ApexGetFineAttributes()

EXPORT **ApexStatus** CALL_CONVENTION
ApexGetFineAttributes

(void * inApexContext,
ApexFineAttributes * outFineAttributes
)

Allows the caller to get the fine attributes configured in API-APEX.

An attribute may be used as input to [ApexGetFines\(\)](#) to act as a filter.

Note

The memory allocated to create the output array is of API-APEX's responsibility, thus no frees on this memory should be called. If memory restriction is a problem, [ApexCleanCache\(\)](#) may be called as soon as the fine attribute array is no longer needed, in order force a free of the memory allocated. Otherwise, this memory will only be freed on [ApexEnd\(\)](#).

Parameters

inApexContext - Handle to the API-APEX Context.
outFineAttributes - Array of the available fine attributes.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.

See also

[ApexStatus](#), [ApexFineAttribute](#), [ApexGetFines](#)

◆ ApexGetFines()

EXPORT **ApexStatus** CALL_CONVENTION
ApexGetFines

(void * inApexContext,
ApexGetFinesInputParameters * inputParameters,
ApexFines * outFines

)

Allows the caller to get the fines for the specified parameters.

When an infraction is identified, this function may be called in order to get the fines associated with it.

Note

The memory allocated to create the output array is of API-APEX's responsibility, thus no frees on this memory should be called. If memory restriction is a problem, [ApexCleanCache\(\)](#) may be called as soon as the fine array is no longer needed, in order force a free of the memory allocated. Otherwise, this memory will only be freed on [ApexEnd\(\)](#).

Parameters

inApexContext - Handle to the API-APEX Context.

inputParameters - Input parameters that define the function's behavior.

outFines - Array of fines associated with the input parameters.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.

See also

[ApexStatus](#), [ApexGetFinesInputParameters](#), [ApexFines](#)

◆ [ApexGetInfractionAttributes\(\)](#)

```
EXPORT ApexStatus CALL_CONVENTION
ApexGetInfractionAttributes( void * inApexContext,
                           ApexInfractionAttributes * outInfractionAttributes
                           )
```

Allows the caller to get the infraction attributes configured in API-APEX.

An attribute may be used as input to [ApexGetInfractions\(\)](#) to act as a filter.

Note

The memory allocated to create the output array is of API-APEX's responsibility, thus no frees on this memory should be called. If memory restriction is a problem, [ApexCleanCache\(\)](#) may be called as soon as the infraction attribute array is no longer needed, in order force a free of the memory allocated. Otherwise, this memory will only be freed on [ApexEnd\(\)](#).

Parameters

inApexContext - Handle to the API-APEX Context.

outInfractionAttributes - Array of the available infraction attributes.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.

See also

[ApexStatus](#), [ApexInfractionAttribute](#), [ApexGetInfractions](#)

◆ ApexGetInfractions()

```
EXPORT ApexStatus
CALL_CONVENTION ApexGetInfractions ( void *  
                                     ApexGetInfractionsInputParameters *  
                                     ApexInfractions *  
                                     )  
                                     inApexContext,  
                                     inputParameters,  
                                     outInfractions
```

Allows the caller to get the infractions for the specified parameters.

After a control operation is conducted, this function may be called in order to get the infractions associated with the control status. Alternatively, this function may also be called with the corresponding input parameters, when a passenger does not possess a means of control.

Note

The memory allocated to create the output array is of API-APEX's responsibility, thus no frees on this memory should be called. If memory restriction is a problem, [ApexCleanCache\(\)](#) may be called as soon as the infraction array is no longer needed, in order force a free of the memory allocated. Otherwise, this memory will only be freed on [ApexEnd\(\)](#).

Parameters

inApexContext - Handle to the API-APEX Context.
inputParameters - Input parameters that define the function's behavior.
outInfractions - Array of infractions associated with the input parameters.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.

See also

[ApexStatus](#), [ApexGetInfractionsInputParameters](#), [ApexInfractions](#),
[ApexGetInfractionAttributes](#)

◆ ApexGetLines()

```
EXPORT ApexStatus CALL_CONVENTION  
ApexGetLines ( void *  
              ApexGetLinesInputParameters *  
              ApexLinesInfo *  
              )  
              inApexContext,  
              inputParameters,  
              outLinesInfo
```

Allows the caller to get the network lines for the specified parameters.

When no longer needed the resulting [ApexLinesInfo](#) structure must be manually freed using [ApexFreeData\(\)](#).

Parameters

- inApexContext** - Handle to the API-APEX Context.
- inputParameters** - Input parameters that define the function's behavior.
- outLinesInfo** - Array of the network lines' information.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_NULL_PARAMETER - inputParameters or outLinesInfo is NULL.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_PARAMETER_ERROR - [ApexGetLinesInputParameters.lineId](#) or patternId were not recognized.

See also

[ApexStatus](#), [ApexLines](#), [ApexFreeData](#)

◆ ApexPaperControl()

EXPORT

ApexStatus

CALL_CONVENTION

```
ApexPaperControl ( void * inApexContext,
                   T_S8 inSecurityData[K_APEX_PAPER_TICKET_SECURITY],
                   ApexControlOutputData * outControlOutputData
)
```

Controls an onboard ticket, taking into account the current location.

Parameters

- inApexContext** - Handle to the API-APEX Context.
- inSecurityData** - Paper ticket security content. This is returned as an output of [ApexPaper](#) on the QRCode of the paper ticket.
- outControlOutputData** - Output parameter containing all data related to the control operation and i

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

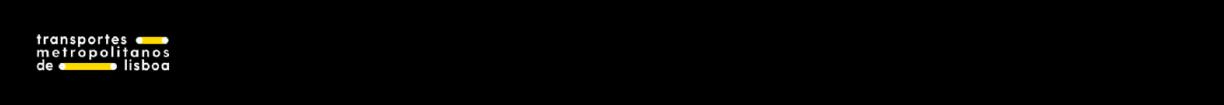
- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_INVALID_SERVICE_LOCATION - invalid or missing control service location.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- Errors relating to card control.

See also

[ApexStatus](#), [ApexControlOutputData](#), [ApexPaperSale](#)

Note

The application should call **ApexSetContext()** to define the control service location whenever the lo



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API-APEX Personalization

Functions

EXPORT **ApexStatus** CALL_CONVENTION **ApexInvalidate** (void *inApexContext)
Invalidates a card. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexRehabilitate** (void *inApexContext)
Recovers a card from an invalid state. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexIssue** (void *inApexContext,
ApexIssueData *inIssueData)
Personalizes or updates a card's personalization and resets the card pin code back to default. [More...](#)

Detailed Description

Set of API-APEX functions focused on card personalization.

Function Documentation

◆ ApexInvalidate()

```
EXPORT ApexStatus CALL_CONVENTION  
ApexInvalidate ( void * inApexContext )
```

Invalidates a card.

A card may be automatically invalidated (e.g. when it is detected that it is present in the blacklist).

This function forces a card to become invalidated so that it may not be used.

Note

If it is intended to invalidate a specific card application, [ApexSetContext\(\)](#) must be called with inParamId set to APEX_CONTEXT_PARAM_ID_SET_CARD_TYPE_ID and inParamConfig to the corresponding card type.

Parameters

inApexContext - Handle to the API-APEX Context.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.

- APEX_STATUS_UNSUPPORTED_CARD_OPERATION_ERROR
- the card type or data model is not supported.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexInvalidate\(\)](#) must be called again.
- Errors relating to card invalidation.

See also

[ApexStatus](#), [F_CB_TransactionReport\(\)](#)

Note

This operation is only supported by LisboaViva and VivaCard cards.

◆ ApexIssue()

EXPORT [ApexStatus](#)

```
CALL_CONVENTION ApexIssue ( void * inApexContext,
                           ApexIssueData * inIssueData
                         )
```

Personalizes or updates a card's personalization and resets the card pin code back to default.

Note

If it is intended to issue on a specific card application, [ApexSetContext\(\)](#) must be called with inParamId set to APEX_CONTEXT_PARAM_ID_SET_CARD_TYPE_ID and inParamConfig to the corresponding card type.

Parameters

inApexContext - Handle to the API-APEX Context.

inIssueData - Card data used to personalize or update the card.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Action lists checked according to the APEX configuration

Action List	List verified?
Card Blacklist	no
SAM Blacklist	no
Greylist	no
Whitelist	no
Greenlist	yes

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_UNSUPPORTED_CARD_OPERATION_ERROR - the card type or data model is not supported.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexIssue\(\)](#) must be called again.
- Errors relating to card personalization.

See also

[ApexStatus](#), [ApexIssueData](#), [F_CB_TransactionReport\(\)](#)

Note

This operation is only supported by LisboaViva and VivaCard cards.

◆ ApexRehabilitate()

EXPORT [ApexStatus](#) CALL_CONVENTION

ApexRehabilitate

(void * inApexContext)

Recovers a card from an invalid state.

This function makes an invalid card usable again. The rehabilitation date is written on the card.

Note

If it is intended to rehabilitate a specific card application, [ApexSetContext\(\)](#) must be called with inParamId set to APEX_CONTEXT_PARAM_ID_SET_CARD_TYPE_ID and inParamConfig to the corresponding card type.

Parameters

inApexContext - Handle to the API-APEX Context.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_UNSUPPORTED_CARD_OPERATION_ERROR - the card type or data model is not supported.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexRehabilitate\(\)](#) must be called again.
- Errors relating to card invalidation.

See also

[ApexStatus](#), [F_CB_TransactionReport\(\)](#)

Note

This operation is only supported by LisboaViva and VivaCard cards.

API-APEX Load

Functions

EXPORT **ApexStatus** CALL_CONVENTION **ApexGetCatalog** (void *inApexContext,
ApexGetCatalogParameters *inGetCatalogParameters,
ApexCatalog *outCatalog)
Fetches the configured products catalog. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexConfigureProduct** (void *inApexContext,
ApexConfigureProductParameters
*inConfigureProductParameters, **ApexProductConfigura**
*inOutProductConfig)
Configures and prepares a product for sale and loading to
[More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexLoad** (void *inApexContext, **ApexPaymentInfo** *inP
T_S8
inApexConfigurationId[K_APEX_CONFIGURATION_ID_I]
Loads the pre-configured product into the card. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexGreenlistLoad** (void *inApexContext,
ApexGreenlistLoadParameters *inGreenlistLoadParam
Forces the loading of the products present in the greenlist
current card. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexUndo** (void *inApexContext, **ApexPaymentInfo**
*inPaymentInfo, T_S8 inTransactionCsv[K_APEX_CSV_I]
Annuls the last contract operation such as sale, load, trans
validation refund. A corresponding transaction is generate

EXPORT **ApexStatus** CALL_CONVENTION **ApexTransfer** (void *inApexContext, **ApexTransferParar**
*inTransferParameters)
Transfer ticket from a card to another or from catalog prod
configuration. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexRemove** (void *inApexContext, T_U8 inContractNum
Removes a contract from a card. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexCancel** (void *inApexContext, **ApexCancelParamet**
*inCancelParameters)
Cancels part of or the totality of a loaded ticket. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexPaperSale** (void *inApexContext, T_S8
inProductId[K_APEX_PRODUCT_ID_MAX_SIZE],
ApexPaymentInfo *inPaymentInfo, **ApexPaperTicketDa**
*outPaperTicketData)

Fetches the required data to print an onboard ticket and generate a sale transaction. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexPaperSaleAck** (void *inApexContext,
ApexPaperSaleAckMode inPaperSaleAckMode,
ApexPaperSaleAckParameters *inPaperSaleAckParam
Confirms an onboard ticket sale and utilization. Generates a validation transaction. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexVerify** (void *inApexContext)
Attempts to finish and resolve an interrupted operation. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexTripRefund** (void *inApexContext, T_S8
inValidationCsv[K_APEX_CSV_MAX_SIZE])
Function used to return the value discounted on a validation.

Detailed Description

Set of API-APEX functions focused on contract sale, load and annulation operations.

Function Documentation

◆ ApexCancel()

EXPORT **ApexStatus** CALL_CONVENTION
ApexCancel

(void * **inApexContext**,
ApexCancelParameters * **inCancelParameters**
)

Cancels part of or the totality of a loaded ticket.

Note

This function was designed with the intention of being used by central systems only, with the ability to define the amount to be returned to the customer. Therefore, this is a required field in **inCancelParameters**.

This operation invalidates any card data currently in cache.

Parameters

inApexContext - Handle to the API-APEX Context.

inCancelParameters - This parameter indicates which contract is to be canceled and by how much.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory
F_CB_ConfirmCancel()	Optional

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_NULL_PARAMETER - **inCancelParameters** is NULL.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexVerify\(\)](#) must be called.
- Errors relating to the contract cancellation.

See also

[ApexStatus](#), [F_CB_TransactionReport\(\)](#), [F_CB_ConfirmCancel\(\)](#)

◆ ApexConfigureProduct()

EXPORT **ApexStatus** CALL_CONVENTION ApexConfigureProduct (void *

ApexConfigureProductParameters
ApexProductConfiguration *

)

Configures and prepares a product for sale and loading to a card.

The configurable products are given by the catalog returned by [ApexGetCatalog\(\)](#). After the first call to must be then called again to customize the selected configurations, unless there are none. As some con

All memory allocation required for inOutProductConfig is handled by API-APEX. This memory is freed up

There are 5 use cases where [ApexConfigureProduct\(\)](#) is called, each requiring different input paramet

1. A product is being configured for a sale operation, i.e. it is intended to sell a product without its immediate product.
2. A product is being configured for a load operation, i.e. it is intended to load a transport product into a container.
3. A product is being configured for both the sale and load operation, i.e. it is intended to sell a product and load it into a container.
4. A new product is being configured in the context of a contract transferral, i.e. the product will then be assigned to a new contract via inConfigureProductParameters.productId set to the selected product.
5. A contract is being loaded from a previous image. This use case is only valid for a central system where inConfigureProductParameters.contractBinary is set with the binary data of the contract image.

In every use case, inConfigureProductParameters.cacheOptimizationFlag may be set to TRUE, which will be 1. In each use case should be set to 0.

Note

On the first call to [ApexConfigureProduct\(\)](#), inOutProductConfig must not be null, but have all its members initialized to 0.

Parameters

inApexContext - Handle to the API-APEX Context.
inConfigureProductParameters - Input parameters.
inOutProductConfig - Product configuration.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_INVALID_PRODUCT_SELECTION - inConfigureProductParameters.productId is invalid.
- APEX_STATUS_CARD_CLEAN - a clean card was detected and its card type does not have a valid configuration.

See also

[ApexStatus](#), [ApexConfigureProductParameters](#), [ApexProductConfiguration](#), [ApexGetCatalog](#)

Use example:

```
ApexCatalog catalog;
ApexProductConfiguration apexProductConfig;

apexStatus = ApexGetCatalog(apexContext, &catalog);

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
} else {
    Show catalog and scan for the chosen product

    memset(&apexProductConfig, 0, sizeof(ApexProductConfiguration));
    apexStatus = ApexConfigureProduct(apexContext, configure parameters, &apexProductConfig);
}
```

```

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
}

do {

    for(int i = 0; i < apexProductConfig.parameterCount; i++){
        Show product parameter defined in apexProductConfig.parameterArray[

            Scan for the chosen value for the parameter

            Set the chosen value in the correct field of apexProductConfig.par
    }

    apexStatus = ApexConfigureProduct(apexContext, configure parameters, &a

    if(apexStatus != APEX_STATUS_NO_ERROR) {
        Handle error
    }
} while(!apexProductConfig.isValid);
}

```

◆ ApexGetCatalog()

EXPORT [ApexStatus](#)
CALL_CONVENTION ApexGetCatalog (void * inApexContext,
ApexGetCatalogParameters * inGetCatalogParameters,
ApexCatalog * outCatalog
)

Fetches the configured products catalog.

Only products with allowed operations are returned, this means that if a channel has no permissions to do any APEX operations with a certain product, said product will not be present in the catalog.

Note

This function returns as an output parameter a copy of the currently loaded catalog. As it is a copy, changing any values in its structure, will not result in a different behavior of API-APEX's subsequent function calls. This means however, that calling this function will result in two catalogs loaded into memory: the internal catalog used by API-APEX and the returned catalog. If memory restriction is a problem, [ApexCleanCache\(\)](#) should be called, in order to free the memory allocated to the copied catalog, as soon as it is no longer needed. Otherwise, this memory will only be freed on [ApexEnd\(\)](#).

The memory allocated to create the copied catalog is of API-APEX's responsibility, thus no frees on this memory should be called.

Parameters

inApexContext - Handle to the API-APEX Context.
inGetCatalogParameters - Input parameters.
outCatalog - Copy of the configured product catalog.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_NULL_PARAMETER - outCatalog is NULL.

See also

[ApexStatus](#), [ApexCatalog](#), [ApexCleanCache\(\)](#), [ApexEnd\(\)](#)

◆ ApexGreenlistLoad()

```
EXPORT ApexStatus
CALL CONVENTION
ApexGreenlistLoad ( void * inApexContext,
                    ApexGreenlistLoadParameters * inGreenlistLoadParameters
                )
```

Forces the loading of the products present in the greenlist for the current card.

This function is only useful if the remaining operations have their ApexGreenlistBehavior set to APEX_GREENLIST_BEHAVIOR_INFO, in order to trigger the loading of a product, after the card has been flagged as having contracts present in the greenlist.

Parameters

inApexContext - Handle to the API-APEX Context.
inGreenlistLoadParameters - Input parameters.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexVerify\(\)](#) must be called.
- Errors relating to contract loading.

See also

[ApexStatus](#), [F_CB_TransactionReport\(\)](#)

◆ ApexLoad()

```
EXPORT ApexStatus ( void * inApexContext,
```

CALL_CONVENTION

ApexLoad

```
ApexPaymentInfo * inPaymentInfo,
T_S8               inApexConfigurationId[K_APEX_CONFIGURATION_ID_M...  
)
```

Loads the pre-configured product into the card.

Before calling this function, [ApexConfigureProduct\(\)](#) must be called to configure a product to load into The API-APEX context manages, during the calls to [ApexConfigureProduct\(\)](#), the product configuration internally and a product ID is generated. The product ID, ensures that the product that will be loaded is the previously configured product.

If this function runs successfully, the memory allocated during product configuration is freed.

Parameters

- | | |
|------------------------------|------------------------------------|
| inApexContext | - Handle to the API-APEX Context. |
| inPaymentInfo | - Payment information and details. |
| inApexConfigurationId | - ID of the configured product. |

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Action lists checked according to the APEX configuration

Action List	List verified?
Card Blacklist	yes
SAM Blacklist	yes
Greylist	yes
Whitelist	no
Greenlist	yes

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_NULL_PARAMETER - inApexConfigurationId is NULL.
- APEX_STATUS_INVALID_CONFIGURATION_ID - inApexConfigurationId is not recognized.
- APEX_STATUS_INVALID_PRODUCT_CONFIGURATION - The current product configuration is valid. Call [ApexConfigureProduct\(\)](#) until a valid configuration is set.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexVerify\(\)](#) must be called.
- Errors relating to contract loading.

See also

[ApexStatus](#), [ApexConfigureProduct\(\)](#), [F_CB_TransactionReport\(\)](#)

Note

The [F_CB_TransactionReport\(\)](#) callback can be invoked twice if a paper card (e.g. VivaViagem) is during the loading operation.

◆ ApexPaperSale()

```
EXPORT ApexStatus
CALL_CONVENTION
ApexPaperSale
(
    void *          inApexContext,
    T_S8           inProductId[K_APEX_PRODUCT_ID_MAX_SIZE],
    ApexPaymentInfo *   inPaymentInfo,
    ApexPaperTicketData * outPaperTicketData
)
```

Fetches the required data to print an onboard ticket and generates a sale transaction.

For tickets printed onboard, the service location must be set with a call to ApexSetContext using inParam the value APEX_CONTEXT_PARAM_ID_SERVICE_LOCATION.

Note

This function only generates the sale of a printed ticket. In order to complete the whole process, this ticket must also be validated, which is done with the call to [ApexPaperSaleAck\(\)](#). If the printing of a ticket does not run successfully, ApexUndo should be called to annul the sale of the ticket.

Parameters

- | | |
|--------------------|--|
| inApexContext | - Handle to the API-APEX Context. |
| inProductId | - Product ID. This identifier must correspond to one given by the catalog. |
| inPaymentInfo | - Payment information and details. |
| outPaperTicketData | - Data needed to print the onboard ticket. |

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.

See also

[ApexStatus](#), [ApexPaperTicketData](#), [ApexPaperSaleAckParameters](#), [ApexPaperSaleAck](#), [ApexSetContext](#)

Use example:

```
ApexPaperTicketData outPaperTicketData;
T_S8 inProductId[K_APEX_PRODUCT_ID_MAX_SIZE]

Get product IDs with the appropriate materialization type
Fill inProductId with the desired productId

apexStatus = ApexPaperSale(apexContext, inProductId, &outPaperTicketData);

if(apexStatus != APEX_STATUS_NO_ERROR) {
```

```

        Handle error
    } else {
        Print ticket

        if(print ticket ok) {
            apexStatus = ApexPaperSaleAck(apexContext, outPaperTicketData.ticketNum

            if(apexStatus != APEX_STATUS_NO_ERROR) {
                Handle error
            }
        } else {
            apexStatus = ApexUndo(apexContext, paperSaleTransaction);

            if(apexStatus != APEX_STATUS_NO_ERROR) {
                Handle error
            }
        }
    }
}

```

◆ ApexPaperSaleAck()

EXPORT ApexStatus CALL_CONVENTION ApexPaperSaleAck	(void * ApexPaperSaleAckMode inApexContext, ApexPaperSaleAckParameters * inPaperSaleAckMode, inPaperSaleAckParameters)
---	--

Confirms an onboard ticket sale and utilization. Generates a validation transaction.

This function must be called after [ApexPaperSale\(\)](#) in order to generate the transaction related to the validation of the onboard ticket. Thus, if this function is not called, it is assumed that the sale of the ticket that started with the call to [ApexPaperSale\(\)](#) did not finish successfully.

The transactions are sent with the callback [F_CB_TransactionReport\(\)](#).

There are 3 different situations where this function is called differently:

- A printed paper ticket is read and its data is passed as input. This represents the use case of an onboard-ticket that is not generated by APEX and has the means for an application to read all its content (e.g. QR code). These tickets are usually pre-sold in bulk to the driver and resold to the passenger. In this case
ApexPaperSaleAckMode.APEX_PAPER_SALE_ACK_MODE_TICKET_DATA_READ should be used and **ApexPaperSaleAckParameters.securityData** should contain the data read.
- A printed ticket's number is manually inserted. This represents the use case of an onboard-ticket that is not generated by APEX and has no means for an application to read all its content (e.g. QR code), thus the controller is only required to manually input the ticket's number. These tickets are usually pre-sold in bulk to the driver and resold to the passenger. In this case
ApexPaperSaleAckMode.APEX_PAPER_SALE_ACK_MODE_MANUAL_INPUT should be used and **ApexPaperSaleAckParameters.ticketNumber** should contain the ticket's number.
- It is intended to confirm the sale of the last ticket sold by [ApexPaperSale\(\)](#). This represents the use case, where an onboard ticket is generated by APEX on demand. In this case
ApexPaperSaleAckMode.APEX_PAPER_SALE_ACK_MODE_LAST_SALE should be used and inPaperSaleAckParameters should be set to NULL.

Parameters

inApexContext	- Handle to the API-APEX Context.
inPaperSaleAckMode	- Mode of operation.
inPaperSaleAckParameters	- Data structure containing the necessary information depending on inPaperSaleAckMode.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_INVALID_SERVICE_LOCATION - invalid or missing service location.

See also

[ApexStatus](#), [ApexPaperSale](#)

◆ [ApexRemove\(\)](#)

```
EXPORT ApexStatus CALL_CONVENTION ApexRemove ( void * inApexContext,
                                              T_U8 inContractNumber
                                              )
```

Removes a contract from a card.

This function removes a contract from a card without restrictions. It is the responsibility of the caller to ensure that the contract is to be removed or not, for instance, after a successful contract transferral with [ApexTransfer\(\)](#).

Note

Contract number 1 is the first contract on the contract array returned when a card is read with [ApexRead\(\)](#).

This operation invalidates any card data currently in cache.

Parameters

inApexContext	- Handle to the API-APEX Context.
inContractNumber	Contract number that is to be removed (starting from 1).

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.

- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_INVALID_CONTRACT_NUMBER - inContractNumber is not a valid contract number.

See also

[ApexStatus](#), [ApexTransfer\(\)](#), [ApexRead\(\)](#)

◆ [ApexTransfer\(\)](#)

```
EXPORT ApexStatus CALL_CONVENTION ApexTransfer( void * inApexContext
                                              ApexTransferParameters * inTransferParameters )
```

Transfer ticket from a card to another or from catalog product configuration.

This function is used when it is intended to transfer a contract from a working card to another or from a n

Parameters

inApexContext - Handle to the API-APEX Context.

inTransferParameters - Structure containing all the parameters for the different transferral modes.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory
F_CB_ConfirmTransfer()	Optional

Note

Transfer from a functioning card:

1. [ApexTransfer\(\)](#) with APEX_TRANSFER_MODE_READ to read the contract (to be transferred)
2. [ApexTransfer\(\)](#) with APEX_TRANSFER_MODE_LOAD_FROM_CARD to load the previously r
3. in case the operation was successful, [ApexRemove\(\)](#) to remove the contract from the first carc

Transfer from a malfunctioning card:

1. [ApexGetCatalog\(\)](#) to fetch the catalog.
2. [ApexConfigureProduct\(\)](#) with the info from the proof of sale provided by the customer and usi APEX_CONFIGURE_PRODUCT_MODE_TRANSFER_Binary.
3. [ApexTransfer\(\)](#) with APEX_TRANSFER_MODE_LOAD_FROM_CATALOG to load the configu

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_NULL_PARAMETER - inTransferParameters is NULL.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, fu in the interrupted transaction. However, if there are other contracts that have not yet been trans resume the contract transferral process.
- Errors relating to contract transferral.

See also

[ApexStatus](#), [ApexRemove\(\)](#), [ApexGetCatalog\(\)](#), [ApexConfigureProduct\(\)](#), [F_CB_TransactionReport\(\)](#)

Use example of a card to card transfer:

```
ApexTransferParameters transferParameters;

Scan which contracts are going to be transferred from the card and fill tra
transferParameters.transferMode = APEX_TRANSFER_MODE_READ;
apexStatus = ApexTransfer(apexContext, &transferParameters);

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
} else {
    Switch the card on the reader to the card that will be receiving the con

    for each of the selected contracts {
        fill transferParameters.contractNumber

        transferParameters.transferMode = APEX_TRANSFER_MODE_LOAD_FROM_CARD;
        apexStatus = ApexTransfer(apexContext, &transferParameters);

        if(apexStatus != APEX_STATUS_NO_ERROR) {
            Handle error
        } else {
            Switch to the first card

            apexStatus = ApexRemove(apexContext, transferParameters.contractNumbe
            if(apexStatus != APEX_STATUS_NO_ERROR) {
                Handle error
            }
        }
    }
}
```

Use example of a catalog to card transfer:

```
ApexProductConfiguration productConfig
ApexConfigureProductParameters configureProductParameters;

configureProductParameters.configureMode = APEX_CONFIGURE_PRODUCT_MODE_TRAN

Configure the product based on the customer's evidence of its purchase by ca

ApexTransferParameters transferParameters;

Fill transferParameters.catalogTransferParameters

transferParameters.transferMode = APEX_TRANSFER_MODE_LOAD_FROM_CATALOG;
apexStatus = ApexTransfer(apexContext, &transferParameters);

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
}
```

Use example of a binary to card transfer:

```

ApexProductConfiguration productConfig
ApexConfigureProductParameters configureProductParameters;

configureProductParameters.configureMode = APEX_CONFIGURE_PRODUCT_MODE_TRAN
set configureProductParameters.contractBinary
set configureProductParameters.cardTypeId according to the binary source

apexStatus = ApexConfigureProduct(apexContext, &configureProductParameters,
if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
}

ApexTransferParameters transferParameters;

Fill transferParameters.catalogTransferParameters

transferParameters.transferMode = APEX_TRANSFER_MODE_LOAD_FROM_CATALOG;
apexStatus = ApexTransfer(apexContext, &transferParameters);

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
}

```

◆ ApexTripRefund()

EXPORT **ApexStatus** CALL_CONVENTION
ApexTripRefund

(void * inApexContext,
T_S8 inValidationCsv[K_APEX_CSV_MAX_SIZE]
)

Function used to return the value discounted on a validation.

This function is mainly used when a customer validated their ticket but the trip was unable to be carried out.

A direct increment on the contract's counter value is performed based on the transaction data.

Parameters

inApexContext - Handle to the API-APEX Context.
inValidationCsv - Validation transaction.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.

- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexVerify\(\)](#) must be called.

See also
[ApexStatus](#)

◆ [ApexUndo\(\)](#)

```
EXPORT ApexStatus
CALL_CONVENTION
ApexUndo ( void * inApexContext,
           ApexPaymentInfo * inPaymentInfo,
           T_S8                 inTransactionCsv[K_APEX_CSV_MAX_SIZE]
         )
```

Annuls the last contract operation such as sale, load, transfer or validation refund. A corresponding transaction is generated.

The card's contents must not have been changed since the loading operation that is the target of the annulment, i.e., no further loads or validations may have been made.

Note

This operation invalidates any card data currently in cache.

Parameters

inApexContext	- Handle to the API-APEX Context.
inPaymentInfo	- Payment information and details.
inTransactionCsv	- CSV of the transaction that is to be annulled (e.g. This is an output of ApexLoad())

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_NULL_PARAMETER - inTransactionCsv is NULL.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred, function [ApexVerify\(\)](#) must be called.
- Errors relating to contract annulment.

See also

[ApexStatus](#), [ApexLoad\(\)](#), [ApexTransfer\(\)](#), [ApexTripRefund\(\)](#), [F_CB_TransactionReport\(\)](#)

◆ [ApexVerify\(\)](#)

```
EXPORT ApexStatus CALL_CONVENTION ApexVerify( void * inApexContext )
```

Attempts to finish and resolve an interrupted operation.

This method must be called immediately after a function returns APEX_STATUS_INTERRUPTED_TRANSACTION and will attempt to finish the operation in an orderly manner.

Note

[ApexVerify\(\)](#) is not suitable to finish interrupted transactions of every operation, as some operations have their own mechanisms to deal with such situations. Check the documentation of the APEX_STATUS_INTERRUPTED_TRANSACTION return status code of each operation for more details on how interrupted transactions should be resolved.

An unresolved interrupted operation/transaction may result in one of the following scenarios:

- The operation was in fact fully completed and the card is in the expected state.
- The operation did not complete and the card remains in the same state as before the operation call.
- The operation was only partially completed, which causes the card to be rendered invalid and unusable in any other operations.

Parameters

inApexContext - Handle to the API-APEX Context.

Remarks

Function callbacks

Callback	Requirement
F_CB_TransactionReport()	Mandatory

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully. The transaction was successfully resolved.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_INVALID_CALLBACK_ERROR - invalid or missing a mandatory callback.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- APEX_STATUS_INTERRUPTED_TRANSACTION - an interrupted transaction has occurred again, function [ApexVerify\(\)](#) must be called again.

See also

[ApexStatus](#)

API-APEX Reader Management

Functions

EXPORT **ApexStatus** CALL_CONVENTION **ApexAddCardReader** (void *inApexContext,
ApexCardReaderConfig *inCardReaderConfig)
Adds and initializes a card reader. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexRemoveCardReader** (void *inApexContext, T_U8
inCardReaderId)
Removes an initialized card reader. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexAddSamReader** (void *inApexContext,
ApexSamReaderConfig *inSamReaderConfig, T_U32
*outSamSerialNumber)
Adds and initializes a SAM reader. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexRemoveSamReader** (void *inApexContext, T_U8
inSamReaderId)
Removes an initialized SAM reader. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexAddCardSamAssociation** (void *inApexContext,
ApexCardSamAssociation *inCardSamAssociation)
Associates a previously added card reader to a
previously added SAM reader. [More...](#)

EXPORT **ApexStatus** CALL_CONVENTION **ApexRemoveCardSamAssociation** (void
*inApexContext)
Removes the current card-SAM association. [More...](#)

Detailed Description

Set of API-APEX functions focused on card reader and SAM reader configurations.

Function Documentation

◆ ApexAddCardReader()

```
EXPORT ApexStatus CALL_CONVENTION  
ApexAddCardReader( void * inApexContext,  
                    ApexCardReaderConfig * inCardReaderConfig  
)
```

Adds and initializes a card reader.

This function stores the required card reader parameters in the API-APEX Context and invokes the API VIVA to initialize it.

Parameters

inApexContext - Handle to the API-APEX Context.
inCardReaderConfig - Card reader configuration parameters.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - **ApexInit()** has not yet been called.
- APEX_STATUS_NULL_PARAMETER - inCardReaderConfig is NULL.
- APEX_STATUS_MEMORY_ALLOCATION_ERROR - unable to allocate the required memory to store the reader parameters in the context.
- Error relating to card reader initialization with the API VIVA.

See also

[ApexStatus](#), [ApexCardReaderConfig](#)

Use example:

```
Initialize Apex

T_S8 com[K_APEX_READER_ADDRESS_MAX_LENGTH] = "COM30:115200";
CardReaderConfig inCardReaderConfig = { 0 };

inCardReaderConfig.id = an arbitrary ID;
inCardReaderConfig.cscType = 0;
strcpy(inCardReaderConfig.readerAddress, com);
inCardReaderConfig.antennaNumber = 0;
inCardReaderConfig.searchMode = 0;
inCardReaderConfig.calypsoNativeMode = 0;

apexStatus = ApexAddCardReader(apexContext, &inCardReaderConfig);

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
}
```

◆ ApexAddCardSamAssociation()

```
EXPORT ApexStatus CALL_CONVENTION  
ApexAddCardSamAssociation  
    ( void * inApexContext,  
      ApexCardSamAssociation * inCardSamAssociation  
    )
```

Associates a previously added card reader to a previously added SAM reader.

This function searches the previously added card and SAM readers and associates them for future operations that require them.

Parameters

- inApexContext** - Handle to the API-APEX Context.
inCardSamAssociation - Structure identifying how and which card and SAM readers are to be associated.

Note

The IDs used in the parameters inCardReaderConfig and inSamReaderConfig of ApexAddCardReader and ApexAddSamReader respectively, are here used to identify each of the readers in inCardSamAssociation.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - **ApexInit()** has not yet been called.
- APEX_STATUS_INVALID_CARD_SAM_ASSOCIATION - the specified card or sam reader was not found.
- Error relating to the association made by the API VIVA.

See also

[ApexStatus](#), [ApexCardSamAssociation](#)

Use example:

```
Initialize Apex

Add a card reader, giving it an arbitrary ID
Add a SAM reader, giving it another arbitrary ID

CardSamAssociation cardSamAssociation;

cardSamAssociation.cardReaderId = the arbitrary card reader ID;
cardSamAssociation.samReaderId = the arbitrary SAM reader ID;
cardSamAssociation.workingMode = K_MODE_ISSUING;

apexStatus = ApexAddCardSamAssociation(apexContext, &cardSamAssociation);

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
}
```

◆ ApexAddSamReader()

```
EXPORT ApexStatus CALL_CONVENTION ApexAddSamReader ( void * inApexContext,
                                                    ApexSamReaderConfig * inSamReaderConfig,
                                                    T_U32 * outSamSerialNumber )
```

Adds and initializes a SAM reader.

This function stores the required SAM reader parameters in the API-APEX Context and invokes the API **ApexInit()** to initialize it.

Parameters

- inApexContext** - Handle to the API-APEX Context.
- inSamReaderConfig** - SAM reader configuration parameters.
- outSamSerialNumber** - serial number of the added SAM.

Returns

APEX Status code. Expected return values:

- **APEX_STATUS_NO_ERROR** - function ran successfully.
- **APEX_STATUS_CONTEXT_ERROR** - a NULL context was passed as input argument.
- **APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR** - **ApexInit()** has not yet been called.
- **APEX_STATUS_NULL_PARAMETER** - **inSamReaderConfig** is NULL.
- **APEX_STATUS_MEMORY_ALLOCATION_ERROR** - unable to allocate the required memory to store the SAM reader parameters in the context.
- Error relating to SAM reader initialization with the API VIVA.

See also

[ApexStatus](#), [ApexSamReaderConfig](#)

Use example:

```
Initialize Apex

T_U32 outSamSerialNumber;
T_S8 com[K_APEX_READER_ADDRESS_MAX_LENGTH] = "COM30:115200";
SamReaderConfig inSamReaderConfig = { 0 };

inSamReaderConfig.id = an arbitrary ID;
inSamReaderConfig.cscType = 0;
strcpy(inSamReaderConfig.readerAddress, com);
inSamReaderConfig.slotNumber = 1;
inSamReaderConfig.samSerialNumber = 0;
inSamReaderConfig.samType = 1;
inSamReaderConfig.samAtrLength = sizeof(inSamReaderConfig.samAtr);

apexStatus = ApexAddSamReader(apexContext, &inSamReaderConfig, &outSamSerialNumber);

if(apexStatus != APEX_STATUS_NO_ERROR) {
    Handle error
}
```

◆ ApexRemoveCardReader()

```
EXPORT ApexStatus CALL_CONVENTION ApexRemoveCardReader ( void * inApexContext,  
                                         T_U8 inCardReaderId  
                                         )
```

Removes an initialized card reader.

This function removes a card reader previously added with [ApexAddCardReader\(\)](#).

Parameters

- inApexContext** - Handle to the API-APEX Context.
- inCardReaderId** - ID of the card reader to be removed.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- Error relating to card reader removal from the API VIVA.

See also

[ApexStatus](#), [ApexAddCardReader\(\)](#)

◆ ApexRemoveCardSamAssociation()

```
EXPORT ApexStatus CALL_CONVENTION  
ApexRemoveCardSamAssociation ( void * inApexContext )
```

Removes the current card-SAM association.

The association between the card and SAM readers is added by calling [ApexAddCardSamAssociation\(\)](#).

Parameters

- inApexContext** - Handle to the API-APEX Context.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- Error relating to the association made by the API VIVA.

See also

[ApexStatus](#), [ApexAddCardSamAssociation\(\)](#)

◆ ApexRemoveSamReader()

```
EXPORT ApexStatus CALL_CONVENTION ApexRemoveSamReader ( void * inApexContext,
                                                       T_U8 inSamReaderId
                                                       )
```

Removes an initialized SAM reader.

This function removes a SAM reader previously added with [ApexAddSamReader\(\)](#).

Parameters

- inApexContext** - Handle to the API-APEX Context.
- inSamReaderId** - ID of the SAM reader to be removed.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - [ApexInit\(\)](#) has not yet been called.
- Error relating to SAM reader removal from the API VIVA.

See also

[ApexStatus](#), [ApexAddSamReader\(\)](#)

API-APEX Central System Support

Functions

EXPORT ApexStatus CALL_CONVENTION	ApexVerifyTransaction (void *inApexContext, T_S8 inTransactionCsv[K_APEX_CSV_MAX_SIZE]) Verifies the validity of the input transaction's signature. More...
EXPORT ApexStatus CALL_CONVENTION	ApexDecodeTransaction (void *inApexContext, T_S8 inTransactionCsv[K_APEX_CSV_MAX_SIZE], T_U32 *outTransactionJsonLength, T_S8 **outTransactionJson) Decodes a transaction into a deserializable json string, to be used by backend systems. More...

Detailed Description

Set of API-APEX functions focused on supporting the central system.

Function Documentation

◆ ApexDecodeTransaction()

```
EXPORT ApexStatus
CALL_CONVENTION
ApexDecodeTransaction( void * inApexContext,
                      T_S8    inTransactionCsv[K_APEX_CSV_MAX_SIZE],
                      T_U32 * outTransactionJsonLength,
                      T_S8 ** outTransactionJson
)
```

Decodes a transaction into a deserializable json string, to be used by backend systems.

Note

API-APEX is responsible for allocating the memory required for the Json string.
[ApexFreeData\(\)](#) should then be called to request APEX to free this memory.

Parameters

inApexContext	- Handle to the API-APEX Context. Used for logging purposes.
inTransactionCsv	- Transaction to be decoded.
outTransactionJsonLength	- Transaction Json string length.
outTransactionJson	- Contains the transaction deserialized to a Json string.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_MEMORY_ALLOCATION_ERROR - unable to allocate memory.

See also

[ApexStatus](#), [ApexFreeData](#)

◆ ApexVerifyTransaction()

```
EXPORT ApexStatus
CALL_CONVENTION
ApexVerifyTransaction( void * inApexContext,
                      T_S8    inTransactionCsv[K_APEX_CSV_MAX_SIZE]
)
```

Verifies the validity of the input transaction's signature.

Parameters

inApexContext - Handle to the API-APEX Context.

inTransactionCsv - Transaction csv.

Returns

APEX Status code. Expected return values:

- APEX_STATUS_NO_ERROR - function ran successfully.
- APEX_STATUS_CONTEXT_ERROR - a NULL context was passed as input argument.
- APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR - `ApexInit()` has not yet been called.
- APEX_STATUS_INVALID_SIGNATURE - transaction signature is not valid.

See also

[ApexStatus](#)

transportes
metropolitanos
de lisboa

API-APEX Callbacks

Typedefs

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_TransactionReport**) (void *inCallbackContext, [ApexTransactionType](#) inTransactionType, T_U16 inTransacT_S8 *inTransaction)
Callback to report to the application the transactions perform the execution of a given operation. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_ConfirmValidation**) (void *inCallbackContext, [ApexCardInfo](#) *inCardInfo, [ApexConfirmValidationInfo](#) *inValidationInfo)
Callback to confirm the validation execution. This callback is invoked before APEX changes any data on the card. This callback is bi-directional gates where it is necessary to confirm that the channel is free. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_PostValidation**) (void *inCallbackContext, [ApexCardInfo](#) *inCardInfo, [ApexValidationInfo](#) *inValidationInfo)
Callback that provides information about the validation macro. This callback is always invoked, except when an internal error occurs in the validation flow. In other words, when [ApexValidate\(\)](#) is invoked, this callback will be invoked whether the card was accepted or rejected. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_ConfirmTransfer**) (void *inCallbackContext, [ApexCardInfo](#) *inCardInfo, [ApexConfirmTransferInfo](#) *inTransferInfo)
Callback to confirm the contract transfer execution. This callback is invoked before APEX changes any data on the card. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_ConfirmCancel**) (void *inCallbackContext, [ApexCardInfo](#) *inCardInfo, [ApexConfirmCancelInfo](#) *inCancelInfo)
Callback to confirm the contract cancellation. This callback is invoked before APEX changes any data on the card. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_GetLoadSequenceId**) (void *inCallbackContext, T_U16 inMachineCode, [T_CardDataModel](#) inCardDataModel, T_U16 *outNumDaily)
Callback to get the current daily number of operations for a machine. This value is written on the card. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_WebService**) (void *inCallbackContext, const T_S8 *inHttpHeaders, const T_S8 *inBodyContent, T_U16 *inOutResponseLength, T_S8 *outResponse, T_U16 *outResponseLength)
Callback to get online access. This callback is used to do a check on greenlist load operations. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_CheckBlacklistCard**) (void *inCallbackContext, T_S8 *inCardInfo, T_U16 *outResponseLength)

inCardTypeid[K_APEX_CARD_TYPE_ID_MAX_SIZE], T_U8 *inCardSerialNumber, T_U8 *outElementExists,
ApexBlacklistCardElement *outBlacklistCardElement)
Callback to check the card blacklist in an environment outs configuration files. [More...](#)

typedef **ApexCallbackStatus**(CALLBACK * **F_CB_CheckBlacklistSam**) (void *inCallbackContext, T_U8 *inSamSerialNumber, T_U8 *outElementExists,
ApexBlacklistSamElement *outBlacklistSamElement)
Callback to check the SAM blacklist in an environment outs configuration files. [More...](#)

typedef **ApexCallbackStatus**(CALLBACK * **F_CB_CheckGreylist**) (void *inCallbackContext, T_S8 inCardTypeid[K_APEX_CARD_TYPE_ID_MAX_SIZE], T_S8
inCardSerialNumber, T_S8 inProductLongId[K_APEX_PRODUCT_ID_MAX_SIZE], T_U32
inMachineCode, T_UtilDate *inLoadDate, T_U32
inLoadSequenceNumber, T_U8 *outElementExists,
ApexGreylistElement *outGreylistElement)
Callback to check the greylist in an environment outside AF configuration files. [More...](#)

typedef **ApexCallbackStatus**(CALLBACK * **F_CB_CheckWhitelistProfile**) (void *inCallbackContext, T_U16 inLastWhitelistItemID[K_APEX_ACTION_LISTS_ITEM_ID]
T_S8 inProfileIdsCount, T_S8 inProfileIdsArray[K_APEX_PROFILES_MAX_SIZE]
[K_APEX_PROFILE_ID_MAX_SIZE], T_UtilDateTime
*inTransactionDateTime, T_S8 inOperatorLongId[K_APEX_OPERATOR_ID_MAX_SIZE],
*outElementExists, T_U8 *outHasNext, **ApexWhitelistProfileElement** *outWhitelistProfileElement)
Callback to check the whitelist for profile combinations in an environment outside APEX's configuration files. [More...](#)

typedef **ApexCallbackStatus**(CALLBACK * **F_CB_CheckWhitelistCard**) (void *inCallbackContext, T_U16 inLastWhitelistItemID[K_APEX_ACTION_LISTS_ITEM_ID]
T_S8 inCardTypeid[K_APEX_CARD_TYPE_ID_MAX_SIZE]
*inCardSerialNumber, T_UtilDateTime *inTransactionDate1
*outElementExists, T_U8 *outHasNext, **ApexWhitelistCardElement** *outWhitelistCardElement)
Callback to check the whitelist for a card in an environment outside APEX's configuration files. [More...](#)

typedef **ApexCallbackStatus**(CALLBACK * **F_CB_CheckGreenlist**) (void *inCallbackContext, T_S8 inLastGreenlistItemID[K_APEX_ACTION_LISTS_ITEM_ID]
T_S8 inCardTypeid[K_APEX_CARD_TYPE_ID_MAX_SIZE]
*inCardSerialNumber, T_UtilDateTime *inTransactionDate1
*outElementExists, T_U8 *outHasNext, **ApexGreenlistElement** *outGreenlistElement)
Callback to check the greenlist in an environment outside A configuration files. [More...](#)

Variables

T_S8 **fileFormatVersion** [K_APEX_FILE_VERSION_MAX_SIZE]

		File format version. More...
T_S8	fileVersion [K_APEX_FILE_VERSION_MAX_SIZE]	File version. More...
T_UtilDateTime	fileDate	File generation date. More...
T_UtilDateTime	fileStartDate	File validity start date. More...
T_UtilDateTime	fileEndDate	File validity end date. More...
T_S8	apexMinVersion [K_APEX_LIBRARY_VERSION_MAX_SIZE]	API-APEX version. More...
T_S8	id [K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE]	Infraction attribute identifier. More...
T_S8	description [K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_SIZE]	Infraction attribute description. More...
T_S8	id [K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE]	Fine attribute identifier. More...
T_S8	description [K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_SIZE]	Fine attribute description. More...
T_U8	id	Arbitrary ID of the card reader. More...
T_CscType	cscType	Reader CSC/Coupler type. More...
T_S8	readerAddress [K_APEX_READER_ADDRESS_MAX_SIZE]	Card reader address. More...
T_U8	antennaNumber	Antenna number. More...
T_SearchMode	searchMode	Card and ticket search mode. More...
T_CalypsoNativeMode	calypsoNativeMode	Card reader Calypso Mode. More...
T_CouplerConfiguration *	couplerConfiguration	Pointer to the structure with the Coupler Configuration. More...

T_U8	id	Arbitrary ID of the SAM reader. More...
T_S8	samTypeId [K_APEX_SAM_TYPE_ID_MAX_SIZE]	Identifier of the SAM type. This ID must match one defined in the technical parameters file. More...
T_CscType	cscType	Reader CSC/Coupler type. More...
T_S8	readerAddress [K_APEX_READER_ADDRESS_MAX_SIZE]	SAM reader address. More...
T_U8	slotNumber	SAM slot number. More...
T_U16	samAttrLen	ATR length of the SAM. More...
T_U8	samAttr [K_ATR_MAX_LENGTH]	ATR returned by the card security module(SAM). More...
T_CouplerConfiguration *	couplerConfiguration	Pointer to the structure with the Coupler Configuration. More...
T_S8	profileId [K_APEX_PROFILE_ID_MAX_SIZE]	Profile identifier. More...
T_S8	profileName [K_APEX_PROFILE_NAME_MAX_SIZE]	Profile name. More...
T_U16	profileNumber	Profile number. More...
T_S8	profileId [K_APEX_PROFILE_ID_MAX_SIZE]	Profile identifier. More...
T_S8	profileName [K_APEX_PROFILE_NAME_MAX_SIZE]	Profile name. More...
T_UtilDate	startDate	Profile start date. More...
T_UtilDate	endDate	Profile expiration date. More...
T_S8	applicationIssuerId [K_APEX_OPERATOR_ID_MAX_SIZE]	Application issuer operator identifier. More...
T_U16	applicationIssuerCode	Application issuer operator code. More...

T_S8	applicationIssuerName [K_APEX_OPERATOR_NAME_MAX_SIZE] Application issuer operator name. More...
T_S8	applicationIssuerShortName [K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE] Application issuer operator short name. More...
T_S8	networkId [K_APEX_NETWORK_ID_MAX_SIZE] Network identifier. More...
T_U32	cardNumber Unique card number by issuer. More...
T_VivaMediaType	mediaType Form factor of the portable object. More...
T_VivaGraphicalLayout	graphicalLayout Graphical layout of the card. More...
T_UtilDate	issuingDate Application issuing date. More...
T_UtilDate	endDate Application expiration date. More...
T_UtilDate	rehabilitationDate Application rehabilitation date. More...
T_U16	countryCode Country ISO-3166 code. More...
T_U16	currencyCode Currency ISO-4217 code. More...
T_U16	holderCompany Identifier of the company where the holder works. More...
T_S8	holderCompanyName [K_APEX_OPERATOR_NAME_MAX_SIZE] Name of the company where the holder works. More...
T_S8	holderCompanyShortName [K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE] Short name of the company where the holder works. More...
T_U32	holderNumber Holder number. More...
T_UtilDate	holderBirthDate Holder birth date. More...
T_U16	profilesCount Number of holder profile data entries. (0..7). More...

ApexCardProfile	*	profilesArray	Array of holder profiles (dynamically allocated). More...
T_U8		issuerDataSize	Issuer data size (in bits). More...
T_U8		issuerData [K_APEX_ISSUER_DATA_MAX_SIZE]	Issuer specific data. More...
T_S8		operatorId [K_APEX_OPERATOR_ID_MAX_SIZE]	Operator identifier. More...
T_S8		operatorName [K_APEX_OPERATOR_NAME_MAX_SIZE]	Operator name. More...
T_S8		operatorShortName [K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE]	Operator short name. More...
T_S8		zonId [K_APEX_ZONE_ID_MAX_SIZE]	Zone identifier. More...
T_S8		zoneName [K_APEX_ZONE_NAME_MAX_SIZE]	Zone name. More...
T_S8		lineId [K_APEX_LINE_ID_MAX_SIZE]	Line identifier. More...
T_S8		lineName [K_APEX_LINE_NAME_MAX_SIZE]	Line name. More...
T_S8		patternId [K_APEX_PATTERN_ID_MAX_SIZE]	Pattern identifier. More...
T_S8		patternName [K_APEX_PATTERN_NAME_MAX_SIZE]	Pattern name. More...
T_S8		stopId [K_APEX_STOP_ID_MAX_SIZE]	Stop identifier. More...
T_S8		stopName [K_APEX_STOP_NAME_MAX_SIZE]	Stop name. More...
ApexZone		originZone	Origin zone. More...
ApexZone		destinationZone	Destination zone. More...
ApexLine		line	Line. More...

ApexPattern	pattern	Pattern. More...
ApexStop	stop	Stop. More...
ApexZone	via	Via zone. More...
T_U16	operatorsCount	Number of elements in the operators array. More...
ApexOperator *	operatorsArray	Array of operators where the spatial validity is applied (dynamically allocated). More...
T_U16	availableZonesCount	Number of elements in the available zones array. More...
ApexZone *	availableZonesArray	Array of zones where the product is valid (dynamically allocated) More...
T_U8	zonesNumberFromStart	Number of valid zones counting from the zone where the product was validated. More...
T_U16	matrixElementsCount	Number of elements in the matrix elements array. More...
ApexMatrixElement *	matrixElementsArray	Array of matrix elements detailing the zones and/or line where the product is valid (dynamically allocated). More...
T_UtilDateTime	validityStartTime	Contract validity start date and time. More...
ApexContractDurationType	contractDurationType	Contract duration type. Gives meaning to the contractDuration field. More...
T_U16	contractDuration	Contract duration value. More...
ApexTripDurationType	tripDurationType	Duration type of a single trip. Gives meaning to the tripDuration field. More...
T_U16	tripDuration	Duration value of a single trip. More...
ApexUnitType	unitType	

		Defines the type of contract units. More...
ApexMaterializationType	materializationType	Product materialization type. More...
T_VivaContractRightExtensionType	rightExtensionType	Product right extension type. More...
ApexTripClass	tripClass	Trip class. More...
T_U8	groupDimension	Group dimension in case of a group contract. More...
T_U16	timeBetweenPassengers	Time (in seconds) allowed between passengers during a validation for a group contract. More...
T_U16	dailyUsageRate	Amount in cents to charge for each day of usage. More...
ApexPreSelectionType	preSelectionType	Contract pre-selection type. More...
ApexPreSelectionODType	preSelectionODType	OD pre-selection type. More...
T_VivaContractUtilization	utilization	Restricts the access of the contract. More...
T_U16	maxDailyUsage	Maximum number of daily usages of the contract. More...
T_U16	contractNumber	Contract number. More...
T_S8	productId [K_APEX_PRODUCT_ID_MAX_SIZE]	Product identifier. More...
T_S8	productName [K_APEX_PRODUCT_NAME_MAX_SIZE]	Product name. More...
ApexOperator	saleOperator	Contract sale/load operator. More...
T_S8	networkId [K_APEX_NETWORK_ID_MAX_SIZE]	Identifier of the network where the contract is valid. More...
T_UtilDate	saleDate	Contract sale date. More...
ApexContractTemporalValidity	temporalValidity	

Temporal validity. [More...](#)

ApexContractCharacteristics **characteristics**

Contract characteristics. [More...](#)

ApexContractRestrictions **restrictions**

Contract restrictions. [More...](#)

T_U8 **interchangeAllowedFlag**

Flag that defines whether interchange is allowed. [More...](#)

T_U32 **saleCount**

Contract loading equipment daily sale number. [More...](#)

T_U32 **saleSamMachineId**

Contract loading SAM (machine code) identifier. [More...](#)

T_U16 **spatialValiditiesCount**

Number of elements in the spatial validities array. [More...](#)

ApexSpatialValidity * **spatialValiditiesArray**

Array of spatial validity records (dinamically allocated). [More...](#)

T_U32 **contractUnits**

Contract units. [More...](#)

T_VivaContractRestrictTime **restrictTime**

Time period restrictions. [More...](#)

T_U8 **contractInGreylistFlag**

Indicates whether or not the contract is present in the greylist. [More...](#)

T_U8 **samInBlacklistFlag**

Indicates whether or not the SAM that loaded the contract is in the blacklist. [More...](#)

T_U16 **requiredContractNumber**

Number of the base contract that this contract needs in order to be valid. [More...](#)

ApexPreValidationStatus **preValidationStatus**

Contract pre-validation status. [More...](#)

T_U8 **allowsReloadFlag**

Indicates whether this contract can currently be reloaded. [More...](#)

T_U8 **contractNumber**

Contract number. [More...](#)

T_UtilDateTime **firstDateTime**

Date and time of the latest trip. [More...](#)

T_U8	usageData Usage data. More...
T_U8	periodStart Start of the period for limited trips. More...
T_U8	periodRemainingTrips Number of remaining trips. More...
T_UtilDateTime	eventDateTime Date and time of the event. More...
T_VivaEventType	eventType Type of the event. More...
T_S8	eventOperatorId [K_APEX_OPERATOR_ID_MAX_SIZE] Event operator identifier. More...
T_S8	networkId [K_APEX_NETWORK_ID_MAX_SIZE] Network where the event occurred. More...
T_U8	journeyInterchanges Interchange counter. More...
T_S8	lineId [K_APEX_LINE_ID_MAX_SIZE] Line identifier. More...
T_S8	patternId [K_APEX_PATTERN_ID_MAX_SIZE] Pattern identifier. More...
T_S8	stopId [K_APEX_STOP_ID_MAX_SIZE] Stop identifier. More...
T_U16	vehicleId Vehicle identifier. More...
T_S8	originZoneId [K_APEX_ZONE_ID_MAX_SIZE] Origin zone identifier. More...
T_S8	destinationZoneId [K_APEX_ZONE_ID_MAX_SIZE] Destination zone identifier. More...
T_U16	contractsUsedMask Mask with the contracts used in the validation. More...
T_U8	profilesUsedMask Mask with the profiles used in the validation. More...
T_U32	deviceId Device identifier. More...

	T_U16 eventContractUsageCount Number of elements in the event contract usage array. More...
ApexEventContractUsage *	eventContractUsageArray Event contract usage data structure (dynamically allocated). More...
	T_U8 issuerDataSize Issuer data size (in bits). More...
	T_U8 issuerData [K_APEX_ISSUER_DATA_MAX_SIZE] Issuer specific data. More...
	T_U32 civilNumber Holder civil number. More...
	T_U32 vatNumber Holder VAT number. More...
	T_S8 name [K_APEX HOLDER NAME MAX SIZE] Holder name. More...
	T_U8 issuerDataSize Issuer data size (in bits). More...
	T_U8 issuerData [K_APEX_ISSUER_DATA_MAX_SIZE] Issuer specific data. More...
	T_U32 value Value of the loyalty counter. More...
T_UtilDate	startDate Start date of the loyalty data. More...
T_UtilDate	endDate End date of the loyalty data. More...
T_UtilDate	loadEndDate Last valid day for the increase of the loyalty counter. More...
ApexOperator	loyaltyOperator Loyalty operator. More...
	T_U8 clientLevel Loyalty level of the client. More...
	T_U16 recordsCount Number of elements in the records array (1..4). More...
ApexLoyaltyOperatorRecord *	recordsArray Array of operator records (dynamically allocated). More...
	T_U16 loyaltyDataNumber

	Loyalty data number. More...
T_U16 operatorDataCount	Number of elements in the operator data array. More...
ApexLoyaltyOperatorData *	operatordataArray Operator specific loyalty data (dynamically allocated). More...
T_UtilDateTime	eventDateTime Date and time of the event. More...
T_VivaEventType	eventType Type of the event. More...
T_UtilDate	exitDateLimit Date limit for the exit. More...
T_UtilTime	exitTimeLimit Time limit for the exit. More...
T_S8 eventOperatorId [K_APEX_OPERATOR_ID_MAX_SIZE]	Event operator identifier. More...
T_S8 networkId [K_APEX_NETWORK_ID_MAX_SIZE]	Network where the event occurred. More...
T_U16 locationId	Location identifier. More...
T_U16 contractsUsedMask	Mask with the contracts used in the validation. More...
T_U8 profilesUsedMask	Mask with the profiles used in the validation. More...
T_U32 deviceid	Device identifier. More...
T_U16 priceAmount	Amount of the event. More...
T_U16 eventContractUsageCount	Number of elements in the event contract usage array. More...
ApexEventContractUsage *	eventContractUsageArray Event contract usage data structure (dynamically allocated). More...
ApexEnvironment	environment Specifies the public transport network environment and holder profiles, in which the card is used. More...
ApexHolderId	holderId

		Card holder identification. More...
T_U16	maxContracts	Maximum number of contracts that can be written to the card for this card type. More...
T_U16	contractsCount	Number of elements in the contracts array. More...
ApexContract *	contractsArray	Array of contracts (dynamically allocated). More...
ApexEvent	event	Transport event data structure (most recent event). More...
T_U16	loyaltyRecordsCount	Number of elements in the loyalty records array. More...
ApexLoyaltyData *	loyaltyRecordsArray	Array of loyalty data records (dynamically allocated). More...
ApexParkData	parkData	Card parking data. More...
ApexIssueMode	issueMode	Identifies the data structures that will be written/updated during the issue operation. More...
ApexEnvironment	issueEnvironment	Environment data for card issuing. More...
ApexHolderId	issueHolderId	Holder data for card issuing. More...
T_CardPhysicalType	cardPhysicalType	Card physical type. More...
T_CardDataModel	cardDataModel	Card data model. More...
T_U64	cardSerialNumber	Card serial number. More...
T_CardValidityState	cardValidityState	Indicates whether or not the card is valid. More...
T_S8	cardTypeId [K_APEX_CARD_TYPE_ID_MAX_SIZE]	Card type identifier. More...
ApexLowLevelErrorType	errorType	Identifies how the low level error structure should be interpreted. More...

T_U32	status1	Represents a status or error depending on the value of errorType. More...
T_U32	status2	Represents a status or error depending on the value of errorType. More...
ApexStatus	apexStatus	Status codes returned by the API-APEX functions. More...
ApexDetailedStatus	apexDetailedStatus	Identifies how the low level error structure should be interpreted. More...
ApexLowLevelError	lowLevelError	Details information on errors occurring on a lower level than the API-APEX. More...
T_S8	operatorId [K_APEX_OPERATOR_ID_MAX_SIZE]	Operator identifier. This ID must match one defined in the Technical Parameters configuration file. More...
T_U16	machineCode	Identifier of the machine running APEX. More...
T_S8	channelId [K_APEX_CHANNEL_ID_MAX_SIZE]	Channel identifier. This ID must match one defined in the commercial offer configuration file. More...
T_S8	deviceId [K_APEX_DEVICE_ID_MAX_SIZE]	Device point of sale identifier. More...
ApexUtilizationMode	utilizationMode	The utilization mode influences the type of validations performed More...
T_S8	numDailyFilePath [K_APEX_FILE_PATH_MAX_SIZE]	Path where the file to manage the operation count is located. More...
T_U16	numDailyMinValue	Minimum value for operations count. More...
T_U16	numDailyMaxValue	Maximum value for operations count. More...
T_S8	operatorId [K_APEX_OPERATOR_ID_MAX_SIZE]	Operator identifier. This ID must match one defined in the Technical Parameters configuration file. More...
T_U16	machineCode	

Identifier of the machine running APEX. [More...](#)

T_S8 **channelId [K_APEX_CHANNEL_ID_MAX_SIZE]**
Channel identifier. This ID must match one defined in the commercial offer configuration file. [More...](#)

T_S8 **deviceId [K_APEX_DEVICE_ID_MAX_SIZE]**
Device point of sale identifier. [More...](#)

ApexUtilizationMode utilizationMode
The utilization mode influences the type of validations performed
[More...](#)

T_S8 **numDailyFilePath [K_APEX_FILE_PATH_MAX_SIZE]**
Path where the file to manage the operation count is located.
[More...](#)

T_U16 **numDailyMinValue**
Minimum value for operations count. [More...](#)

T_U16 **numDailyMaxValue**
Maximum value for operations count. [More...](#)

T_S8 **techParamsFullFilename [K_APEX_FILE_PATH_MAX_SIZE]**
Name and path of the technical parameters configuration file.
[More...](#)

T_S8 **networkFullFilename [K_APEX_FILE_PATH_MAX_SIZE]**
Name and path of the network topology configuration file. [More..](#)

T_S8 **comOfferFullFilename [K_APEX_FILE_PATH_MAX_SIZE]**
Name and path of the commercial offer configuration file. [More...](#)

T_S8 **actionListsFullFilename [K_APEX_FILE_PATH_MAX_SIZE]**
Name and path of the action lists configuration file. [More...](#)

T_S8 **operatorId [K_APEX_OPERATOR_ID_MAX_SIZE]**
Operator identifier. This ID must match one defined in the Technical Parameters configuration file. [More...](#)

T_S8 **channelId [K_APEX_CHANNEL_ID_MAX_SIZE]**
Channel identifier. This ID must match one defined in the commercial offer configuration file. [More...](#)

T_S8 **techParamsFullFilename [K_APEX_FILE_PATH_MAX_SIZE]**
Name and path of the technical parameters configuration file.
[More...](#)

T_S8 **networkFullFilename [K_APEX_FILE_PATH_MAX_SIZE]**
Name and path of the network topology configuration file. [More..](#)

T_S8 **comOfferFullFilename [K_APEX_FILE_PATH_MAX_SIZE]**
Name and path of the commercial offer configuration file. [More...](#)

T_S8	actionListsFullFilename [K_APEX_FILE_PATH_MAX_SIZE]	Name and path of the action lists configuration file. More...
T_CardPhysicalType	cardPhysicalType	Physical type of the detected card. More...
T_U64	cardSerialNumber	Serial number of the detected card. More...
T_CardValidityState	cardValidityState	Indicates whether the card is in a valid state or if the application has been invalidated. More...
T_CardFamily	cardFamily	Family of the detected card. More...
T_U8	cardInfo [K_APEX_SELECT_APP_INFO_MAX_SIZE]	Contains the card initial information. This information depends upon the type of the card detected: More...
T_U16	cardInfoLength	Length of the cardInfo byte array. More...
T_U8	kvc	Key version and category of the selected application. More...
T_U16	binaryDataSize	Size of binaryData. More...
T_U8	binaryData [K_APEX_BINARY_MAX_SIZE]	Array containing the binary data. More...
ApexBinary	environmentBinary	Environment binary data. More...
ApexBinary	holderIdBinary	Holder ID binary data. More...
ApexBinary	eventBinary	Event binary data. More...
T_U16	maxContractBinaries	Maximum number of contract binaries that can be written to the card for this card type. More...
ApexBinary	contractBinariesArray [K_APEX_CONTRACTS_MAX_SIZE]	Array of contract binaries (sparse array). More...
T_U16	maxLoyaltyBinaries	Maximum number of loyalty binaries that can be written to the card for this card type. More...

	ApexBinary loyaltyBinariesArray [K_APEX_LOYALTY_RECORDS_MAX_SIZE] Array of loyalty binaries (sparse array). More...
	ApexBinary parkBinary Park binary data. More...
	T_U16 level Arbitrary level. More...
	T_S8 description [K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE] Description of the product category. More...
	T_S8 id [K_APEX_CARD_TYPE_ID_MAX_SIZE] Identifier of the card type. More...
	T_U16 profilesCount Number of elements in the profiles array. More...
	ApexProfile * profilesArray Array of profiles. More...
	T_S8 salesPackageId [K_APEX_SALES_PACKAGE_ID_MAX_SIZE] Identifier of the sales package. More...
	T_U8 groupDimension Group dimension. More...
	T_U16 unitsNumber Number of units. More...
	T_S32 price Price in cents of the sales package. More...
	T_S32 taxPercentage Value in percentage of the applied tax rate. More...
	T_S32 taxValue Value in cents of the tax. More...
	T_S8 productId [K_APEX_PRODUCT_ID_MAX_SIZE] Identifier of the product. More...
	T_S8 productName [K_APEX_PRODUCT_NAME_MAX_SIZE] Name of the product. More...
	T_U16 productCategoriesCount Number of elements in the product category array. More...
	ApexProductCategory * productCategoriesArray Array of the product's categories. More...

T_U16	cardTypeIdsCount	Number of elements in the card type ids array. More...
ApexCardTypeld *	cardTypeIdsArray	Array of card types valid for the product. More...
T_U16	profileCombinationsCount	Number of elements in the profile combination array. More...
ApexProfileCombination *	profileCombinationsArray	Array of the profile combinations required by the product. More..
T_U16	salesPackagesCount	Number of elements in the sales packages array. More...
ApexProductSalesPackage *	salesPackagesArray	Array of the product's sales packages. More...
ApexMaterializationType	materializationType	Materialization type. More...
T_U8	operationsAllowed [APEX_OPERATION_TYPE_MAX_VALUE]	Indicates which operations are allowed for this product. Each element in the array represents a product operation, and its index is represented by the product operation value in the enumerated. If the array element has a value of one (1), it indicates that the operation is allowed, otherwise it is prohibited. More...
T_VivaContractRightExtensionType	rightExtensionType	Right extension type. More...
T_U8	groupFlag	Defines whether the product is a group ticket or not. More...
T_S8	zoneld [K_APEX_ZONE_ID_MAX_SIZE]	Identifier of the zone. More...
T_U8	isSelectedFlag	Indicates whether this element has been selected as one of the loading configuration choices. More...
T_S8	zoneName [K_APEX_ZONE_NAME_MAX_SIZE]	Zone name. More...
T_S8	spatialValidityId [K_APEX_GENERIC_ID_MAX_SIZE]	Identifier of the spatial validity. More...
T_U8	isSelectedFlag	Indicates whether this element has been selected as the loading configuration choice. More...

T_S8	lineName [K_APEX_LINE_NAME_MAX_SIZE] Line name. More...
T_S8	originZoneName [K_APEX_ZONE_NAME_MAX_SIZE] Origin zone name. More...
T_S8	destinationZoneName [K_APEX_ZONE_NAME_MAX_SIZE] Destination zone name. More...
T_S8	viaZoneName [K_APEX_ZONE_NAME_MAX_SIZE] Via zone name. More...
T_S8	salesPackageId [K_APEX_SALES_PACKAGE_ID_MAX_SIZE] Identifier of the sales package. More...
T_U8	isSelectedFlag Indicates whether this element has been selected as the loading configuration choice. More...
T_U8	groupDimension Group dimension. More...
T_U16	unitsNumber Number of units. More...
T_S32	price Price in cents of the sales package. More...
T_S32	taxPercentage Value in percentage of the applied tax rate. More...
T_S32	taxValue Value in cents of the tax. More...
ApexProductParamType	type Identifier of the parameter. More...
T_U32	numValue Numeric value configuration for the parameter. More...
T_U64	numValue64 64-bit numeric value configuration for the parameter. More...
T_UtilDateTime	dateTimeValue Date and time value configuration for the parameter. More...
T_S8	textValue [K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_SIZE] Text value configuration for the parameter. More...
T_S8	configId [K_APEX_GENERIC_ID_MAX_SIZE] Internal APEX reference identifier. More...

	T_U16	zoneChoiceNumberOfSelections	Number of elements in the zone choice array that must be selected. More...
	T_U16	zoneChoiceCount	Number of elements in the zone choice array. More...
	ApexProductZoneChoice	*	zoneChoiceArray Available zones for configuration. More...
	T_U16	spatialValidityChoiceCount	Number of elements in the spatial validity choice array. More...
	ApexProductSpatialValidityChoice	*	spatialValidityChoiceArray Available spatial validity elements for configuration. More...
	T_U16	salesPackageChoiceCount	Number of elements in the sales package choice array. More...
	ApexProductSalesPackageChoice	*	salesPackageChoiceArray Available sales packages for configuration. More...
	T_S8	productId [K_APEX_PRODUCT_ID_MAX_SIZE]	Physical support product identifier. More...
	T_S8	productName [K_APEX_PRODUCT_NAME_MAX_SIZE]	Physical support name. More...
	T_S8	salesPackagId [K_APEX_SALES_PACKAGE_ID_MAX_SIZE]	Identifier of the sales package that will be used in the physical support sale. More...
	T_S32	price	Price in cents of the physical support. More...
	T_S32	taxPercentage	Value in percentage of the applied tax rate. More...
	T_S32	taxValue	Value in cents of the tax. More...
	T_S8	configurationId [K_APEX_CONFIGURATION_ID_MAX_SIZE]	Used to identify the product configuration during ApexLoad() or ApexTransfer() . More...
	ApexConfigureProductStatus	status	Contains the status of the current product configuration. More...
	T_S32	price	Total amount to be requested to the customer in cents. More...

	T_U8 parameterCount Number of configuration parameters in the parameter array. More...
ApexProductParameter *	parameterArray Parameters available for configuration. More...
	T_U8 hasPhysicalSupport Defines whether the product sale/load requires the sale of a physical support. More...
ApexPhysicalSupport	physicalSupport Details of the physical support sale. More...
	T_S8 transactionId [K_APEX_TRANSACTION_ID_MAX_SIZE] Control transaction unique identifier. More...
ApexCardInfo	cardInfo Card information and details. More...
ApexCardData	cardData Contains the card data structures. More...
ApexControlEnvironmentStatus	environmentStatus Indicates the status of the control operation over the environment data. More...
	T_U16 contractStatusCount Number of elements in the contract status array. More...
ApexControlContractStatus	contractStatusArray [K_APEX_CONTRACTS_MAX_SIZE] Each element of the contractStatusArray identifies the control status of the respective contract present in the cardData.contractsArray. More...
	T_U8 contractsInGreenlistFlag Indicates whether or not the card has greenlist contracts waiting to be loaded. More...
ApexControlWhitelistStatus	whitelistStatus Indicates the status of the control operation over the data presented in the whitelist. More...
ApexControlStatus	controlStatus Status code with the overall result of the control. More...
	T_S8 id [K_APEX_INFRACTION_ID_MAX_SIZE] Infraction identifier. More...
	T_S8 description [K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE] Infraction description. More...
	T_U16 infractionAttributesCount Number of elements in the infraction attributes array. More...

ApexInfractionAttribute	*	infractionAttributesArray	Array of infraction attributes. More...
T_U8	contractStatusMask	[APEX_CONTROL_CONTRACT_STATUS_MAX_VALUE]	Array of booleans indicating which contract status are associated. Each index of the array is directly associated to an ApexControlContractStatus value. More...
T_U8	environmentStatusMask	[APEX_CONTROL_ENVIRONMENT_STATUS_MAX_VALUE]	Array of booleans indicating which environment status are associated. Each index of the array is directly associated to an ApexControlEnvironmentStatus value. More...
T_S8	procedure	[K_APEX_INFRACTION_PROCEDURE_MAX_SIZE]	Procedure to follow in the case of the infraction. More...
T_S8	id	[K_APEX_FINE_ID_MAX_SIZE]	Fine identifier. More...
T_S8	description	[K_APEX_FINE_DESCRIPTION_MAX_SIZE]	Fine description. More...
T_U16	fineAttributesCount		Number of elements in the fine attributes array. More...
ApexFineAttribute	*	fineAttributesArray	Array of fine attributes. More...
T_U16	infractionsCount		Number of elements in the infractions array. More...
ApexInfraction	*	infractionsArray	Array of infractions. More...
T_S32	minAmount		Minimum fine amount in cents. More...
T_S32	maxAmount		Maximum fine amount in cents. More...
T_S32	promptAmount		Fine amount in the case of immediate payment. More...
T_S8	stopId	[K_APEX_STOP_ID_MAX_SIZE]	Stop identifier. More...
T_S8	stopName	[K_APEX_STOP_NAME_MAX_SIZE]	Stop name. More...
T_S8	patternId	[K_APEX_PATTERN_ID_MAX_SIZE]	

		Line identifier. More...
T_S8	patternName [K_APEX_PATTERN_NAME_MAX_SIZE]	Line name. More...
T_U16	stopInfoCount	Number of elements in the stops array. More...
ApexStopInfo *	stopInfoArray	Array of pattern stops. More...
T_S8	lineId [K_APEX_LINE_ID_MAX_SIZE]	Line identifier. More...
T_S8	lineName [K_APEX_LINE_NAME_MAX_SIZE]	Line name. More...
T_U16	patternInfoCount	Number of elements in the pattern array. More...
ApexPatternInfo *	patternInfoArray	Array of line patterns. More...
T_U16	lineInfoCount	Number of elements in the lines array. More...
ApexLineInfo *	lineInfoArray	Array of line. More...
T_S8	infractionAttributeId [K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE]	Infraction attribute identifier. More...
ApexControlEnvironmentStatus	environmentStatus	Environment control status. More...
ApexControlContractStatus	contractStatus	Contract control status. More...
T_S8	infractionNumber [K_APEX_INFRACTION_NUMBER_MAX_SIZE]	Infraction fine number. More...
T_S8	fineOperatorId [K_APEX_OPERATOR_ID_MAX_SIZE]	Operator entity code. More...
T_S8	offenderName [K_APEX_OFFENDER_NAME_MAX_SIZE]	Name of the offender. More...
T_UtilDate	offenderBirthDate	Birth date of the offender. More...
T_S8	offenderAddress [K_APEX_OFFENDER_ADDRESS_MAX_SIZE]	

Address of the offender. [More...](#)

T_S8 **offenderPostalCode**
[K_APEX_OFFENDER_POSTAL_CODE_MAX_SIZE]
Postal code of the offender. [More...](#)

ApexDocumentType **offenderDocumentType**
Identification document type of the offender. [More...](#)

T_S8 **offenderIdentityNumber**
[K_APEX_IDENTITY_NUMBER_MAX_SIZE]
Identity number of the offender. [More...](#)

T_S8 **offenderVatNumber** [K_APEX_VAT_NUMBER_MAX_SIZE]
VAT number of the offender. [More...](#)

T_S8 **infractionDescription**
[K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE]
Infraction description. [More...](#)

T_S8 **infractionPlace** [K_APEX_INFRACTION_PLACE_MAX_SIZE]
Locality where the infraction took place. [More...](#)

T_UtilDateTime **infractionDate**
Infraction date. [More...](#)

T_UtilDateTime **infractionNoticeDate**
Date of the emission of the fine. [More...](#)

ApexDocumentType **controllerDocumentType**
Identification document type of the controller. [More...](#)

T_S8 **controllerIdentityNumber**
[K_APEX_IDENTITY_NUMBER_MAX_SIZE]
Identity number of the controller. [More...](#)

ApexDocumentType **witnessDocumentType**
Identification document type of the witness. [More...](#)

T_S8 **witnessIdentityNumber**
[K_APEX_IDENTITY_NUMBER_MAX_SIZE]
Identity number of the witness. [More...](#)

T_S8 **infractionId** [K_APEX_INFRACTION_ID_MAX_SIZE]
Infraction identifier. [More...](#)

T_S8 **finId** [K_APEX_FINE_ID_MAX_SIZE]
Fine identifier. [More...](#)

T_S8 **attachedDocumentName**
[K_APEX_DOCUMENT_NAME_MAX_SIZE]
Attached document name. [More...](#)

	ApexDocumentType attachedDocumentType Attached document type. More...
T_S8	attachedDocumentObs [K_APEX_DOCUMENT_OBS_MAX_SIZE] Observations on the attached document. More...
T_S32	fineAmount Fine amount applied. More...
T_S8	cardTypeId [K_APEX_CARD_TYPE_ID_MAX_SIZE] Identifier of the damaged card's type. More...
T_U8	cardIssuer Card issuer. More...
T_U32	cardNumber Card number. More...
T_U64	cardSerialNumber Card serial number. More...
T_S8	fineAttributeId [K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE] Fine attribute identifier. More...
T_S8	infractionId [K_APEX_INFRACTION_ID_MAX_SIZE] Infraction identifier. More...
T_S8	lineId [K_APEX_LINE_ID_MAX_SIZE] Line filter. More...
T_S8	patternId [K_APEX_LINE_ID_MAX_SIZE] Pattern filter. More...
T_U8	includePatternsFlag Defines whether the output contains the patterns for each line. More...
T_U8	includeStopsFlag Defines whether the output contains the stops for each pattern. More...
T_U8	contractNumber Contract number (starting from 1) of the contract to which the pre-selection is going to be applied. More...
T_U8	isODPreSelectionFlag Specifies an origin/destination or contract pre-selection. More...
T_S8	configurationId [K_APEX_CONFIGURATION_ID_MAX_SIZE] Used to identify the Pre-Selection configuration during ApexPreSelection() . More...
T_U8	isValid

		Informs whether the current configuration is valid or not. Only a valid configuration will be accepted by ApexPreSelection() . More...
T_U8	isODPreSelectionFlag	Informs whether the current configuration requires a selection of Origin and Destination zones. More...
T_U16	originZoneSelectedIndex	Selected origin zone index. More...
T_U16	originZonesCount	Number of elements of the originZonesArray. More...
ApexZone *	originZonesArray	Array containing all available origin zones. More...
T_U16	destinationZoneSelectedIndex	Selected destination zone index. More...
T_U16	destinationZonesCount	Number of elements of the destinationZonesArray. More...
ApexZone *	destinationZonesArray	Array containing all available destination zones for the currently selected origin zone. More...
T_U8	cardFilterFlag	Filter catalog based on the card read. Only products suitable for card are returned. More...
T_U8	cacheOptimizationFlag	Optimizes the operation using the cached data of the last card read with ApexRead() . More...
T_U8	locationFilterFlag	Filter the catalog's onboard ticket products based on the current location. More...
ApexConfigureProductMode	configureMode	ApexConfigureProduct() mode of operation. More...
T_S8	productId [K_APEX_PRODUCT_ID_MAX_SIZE]	Product id. This identifier must correspond to one given by the catalog. More...
ApexBinary	contractBinary	Contract binary. More...
T_S8	cardTypeId [K_APEX_CARD_TYPE_ID_MAX_SIZE]	Card type ID. More...
T_U8	cacheOptimizationFlag	Optimizes the configuration process using the cached data of the

last card read with **ApexRead()**. More...

ApexPaymentMethod **paymentMethod**

Payment method used during a product sale. More...

T_S8 **vatNumber** [K_APEX_VAT_NUMBER_MAX_SIZE]
VAT number. More...

T_S8 **invoiceNumber** [K_APEX_INVOICE_NUMBER_MAX_SIZE]
Invoice number. More...

T_U8 **profileValidationFlag**

If TRUE (1), it indicates that the validation will be executed using whitelist profile. Otherwise, it indicates that the validation will be performed by a contract. More...

T_S8 **productId** [K_APEX_PRODUCT_ID_MAX_SIZE]
Product identifier. More...

T_S8 **productName** [K_APEX_PRODUCT_NAME_MAX_SIZE]
Product name. More...

T_U32 **unitsToDebit**

Number of units to be debited. More...

T_U16 **profilesCount**

Number of elements in the profiles array. More...

ApexCardProfile **profilesArray** [K_APEX_PROFILES_MAX_SIZE]
Array of profiles to be used in the validation. More...

T_VivaEventType **eventType**

Event type (entry, exit, ...). More...

T_UtilDateTime **initialDateTime**

Initial date/time of the trip. More...

T_UtilDateTime **finalDateTime**

Final date/time of the trip. More...

ApexValidationStatus **validationStatus**

Validation result status. More...

T_S8 **productId** [K_APEX_PRODUCT_ID_MAX_SIZE]
Product identifier. More...

T_S8 **productName** [K_APEX_PRODUCT_NAME_MAX_SIZE]
Product name. More...

T_U8 **productHasExpirationDate**

Indicates if the product has an expiration date. More...

T_UtilDateTime	productExpirationDate	Product expiration date (present if productHasExpirationDate is set). More...
ApexUnitType	unitType	Type of units considered. More...
T_U32	decrementedUnits	Number of units decremented (present if unitType is not NONE). More...
T_U32	remainingUnits	Number of units remaining (present if unitType is not NONE). More...
T_U16	profilesCount	Number of elements in the profiles array. More...
ApexCardProfile	profilesArray [K_APEX_PROFILES_MAX_SIZE]	Array of profiles used in the validation (present if profilesCount is bigger than 0). More...
ApexTripDuration	tripDuration	Trip duration according with the operator's exploration period. More...
T_S8	productId [K_APEX_PRODUCT_ID_MAX_SIZE]	Product identifier. More...
T_S8	productName [K_APEX_PRODUCT_NAME_MAX_SIZE]	Product name. More...
T_UtilDate	saleDate	Contract sale date. More...
T_UtilDate	validityStartDate	Contract validity start date. Empty if not defined or not used. More...
T_UtilDate	validityEndDate	Last valid day of the contract. Empty if not defined or not used. More...
ApexUnitType	unitType	Type of units represented by the counter. More...
T_U32	units	Number of units in the counter that will be transferred. More...
T_S8	productId [K_APEX_PRODUCT_ID_MAX_SIZE]	Product identifier. More...
T_S8	productName [K_APEX_PRODUCT_NAME_MAX_SIZE]	Product name. More...

T_UtilDate	saleDate	Contract sale date. More...
T_UtilDate	validityStartDate	Contract validity start date. Empty if not defined or not used. More...
T_UtilDate	validityEndDate	Last valid day of the contract. Empty if not defined or not used. More...
ApexContractDurationType	temporalUnitsType	Type of the temporal validity units that will be removed. More...
T_U32	temporalUnits	Number of temporal validity units that will be removed. More...
ApexUnitType	unitType	Type of units represented by the counter. More...
T_U32	units	Number of units in the counter that will be removed. More...
T_S32	price	Value, in cents, to be returned to the customer. More...
T_S32	dailyUsageValue	Total amount, in cents, of the daily usage value calculated by the product's corresponding daily usage rate. More...
T_S8	ticketNumber [K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE]	Ticket number. More...
T_UtilDateTime	saleDate	Sale date. More...
T_UtilDateTime	expirationDate	Expiration date. More...
T_S32	price	Ticket price. More...
T_S32	taxPercentage	Value in percentage of the applied tax rate. More...
T_S8	operatorName [K_APEX_OPERATOR_NAME_MAX_SIZE]	Operator name. More...
T_S8	operatorShortName [K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE]	Operator short name. More...

T_S8	lineName [K_APEX_LINE_NAME_MAX_SIZE] Line name. More...
T_S8	patternName [K_APEX_PATTERN_NAME_MAX_SIZE] Pattern name. More...
T_S8	stopName [K_APEX_STOP_NAME_MAX_SIZE] Stop name. More...
T_S8	securityData [K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE] Paper ticket security content. This content is used as input for the paper ticket control operation. More...
T_S8	cardBlacklistItemId [K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE] Identifier of the blacklist element. More...
T_S8	cardTypeid [K_APEX_CARD_TYPE_ID_MAX_SIZE] Card type identifier. More...
T_U64	cardSerialNumber Card serial number. More...
T_S8	samBlacklistItemId [K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE] Identifier of the blacklist element. More...
T_S8	samTypeid [K_APEX_SAM_TYPE_ID_MAX_SIZE] SAM type identifier (configured in the technical parameters file). More...
T_U64	samSerialNumber SAM serial number. More...
T_U8	hasStartDate Indicates if the "startDate" field was set. More...
T_UtilDateTime	startDate Start date of the blacklist element effective period. More...
T_U8	hasEndDate Indicates if the "endDate" field was set. More...
T_UtilDateTime	endDate End date of the blacklist element effective period (inclusive). More...
T_S8	greylistItemId [K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE] Identifier of the greylist element. More...
T_S8	cardTypeid [K_APEX_CARD_TYPE_ID_MAX_SIZE] Card type identifier. More...

T_U64	cardSerialNumber Card serial number. More...
T_S8	productLongId [K_APEX_PRODUCT_ID_MAX_SIZE] Product to which this greylist element is applied. More...
T_U8	hasMachineCode Indicates if the "machineCode" field was set. More...
T_U16	machineCode Loading machine code. More...
T_U8	hasLoadDate Indicates if the "loadDate" field was set. More...
T_UtilDate	loadDate Ticket load date. More...
T_U8	hasLoadSequenceNumber Indicates if the "loadSequenceNumber" field was set. More...
T_U16	loadSequenceNumber Ticket load sequence number. More...
T_U8	hasCardDataModel Indicates if the "cardDataModel" field was set. More...
T_CardDataModel	cardDataModel Card data model. More...
T_S8	spatialValidityId [K_APEX_SPATIAL_VALIDITY_ID_MAX_SIZE] Associated spatial validity identifier. More...
T_S8	matrixElementId [K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE] Product matrix element identifier. More...
T_U32	zonesCount Number of entries with data in the zonesArray. More...
T_S8	zoneIdArray [K_APEX_MAX_AVAILABLE_ZONES_COUNT] [K_APEX_ZONE_ID_MAX_SIZE] Array of zone identifiers. More...
T_S8	whitelistItemId [K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE] Identifier of the whitelist element. More...
T_S8	productLongId [K_APEX_PRODUCT_ID_MAX_SIZE] Product to which this whitelist element is applied. More...
T_U32	spatialValiditiesCount Number of entries in the spatialValiditiesArray. More...

ApexSpatialValidityData	*	spatialValiditiesArray	Array of spatial validity associations. More...
T_UtilDateTime		startDate	Start date of the whitelist element effective period. More...
T_U8		hasEndDate	Indicates if the "endDate" field was set. More...
T_UtilDateTime		endDate	End date of the whitelist element effective period (inclusive). More...
ApexAntipassbackMode		antipassbackMode	Anti-passback mode to be used for the whitelist element. More...
T_U16		usedProfilesCount	Number of entries with data in the usedProfilesIdArray. More...
T_S8		usedProfilesIdArray [K_APEX_PROFILES_MAX_SIZE] [K_APEX_PROFILE_ID_MAX_SIZE]	Array of profile identifiers. More...
T_S8		whitelistItemId [K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]	Identifier of the whitelist element. More...
T_S8		cardTypeId [K_APEX_CARD_TYPE_ID_MAX_SIZE]	Card type identifier. More...
T_U64		cardSerialNumber	Card serial number. More...
T_S8		productLongId [K_APEX_PRODUCT_ID_MAX_SIZE]	Product to which this whitelist element is applied. More...
T_U32		spatialValiditiesCount	Number of entries in the spatialValiditiesArray. More...
ApexSpatialValidityData	*	spatialValiditiesArray	Array of spatial validity associations. More...
T_UtilDateTime		startDate	Start date of the whitelist element effective period. More...
T_U8		hasEndDate	Indicates if the "endDate" field was set. More...
T_UtilDateTime		endDate	End date of the whitelist element effective period (inclusive). More...
ApexAntipassbackMode		antipassbackMode	Anti-passback mode to be used for the whitelist element. More...

T_S8	greenlistItemId [K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]
	Identifier of the greenlist element. More...
T_S8	cardTypeid [K_APEX_CARD_TYPE_ID_MAX_SIZE]
	Card type identifier. More...
T_U64	cardSerialNumber
	Card serial number. More...
T_S8	productLongId [K_APEX_PRODUCT_ID_MAX_SIZE]
	Product to which this greenlist element is applied. More...
T_S8	authorizationId [K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_SIZE]
	Authorization identifier. More...
T_S8	salesPackageld [K_APEX_SALES_PACKAGE_ID_MAX_SIZE]
	Product sales package identifier. More...
T_U32	spatialValiditiesCount
	Number of entries in the spatialValiditiesArray. More...
ApexSpatialValidityData *	spatialValiditiesArray
	Array of spatial validity associations. More...
T_UtilDateTime	contractStartDate
	Start date of the greenlist element contract. More...
T_U8	onlineCheckFlag
	Indicates whether online checks are mandatory for this greenlist element (boolean). More...
T_S8	personalizationId [K_APEX_PERSONALIZATION_ID_MAX_SIZE]
	Personalization identifier (future use). More...

Detailed Description

API-APEX callbacks functions.

Typedef Documentation

◆ F_CB_CheckBlacklistCard

```
typedef ApexCallbackStatus(CALLBACK* F_CB_CheckBlacklistCard) (void *inCallbackContext,  
T_S8 inCardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE], T_U64 *inCardSerialNumber, T_U8  
*outElementExists, ApexBlacklistCardElement *outBlacklistCardElement)
```

Callback to check the card blacklist in an environment outside APEX's configuration files.

Note

This callback must be defined in conjunction with F_CB_CheckBlacklistCard, F_CB_CheckBlacklistSam, F_CB_CheckGreylist, F_CB_CheckWhitelistProfile, F_CB_CheckWhitelistCard, F_CB_CheckGreenlist.

If none of these callbacks are defined, APEX will use the Action Lists specified by the configuration file.

If at least one of these callbacks is not defined, an error will occur during the call to any APEX operation.

If all callbacks are defined, APEX will ignore the Action Lists specified by the configuration file and use the callbacks instead.

Parameters

inCallbackContext	- Callback context provided by the application.
inCardTypeId	- Card type identifier.
inCardSerialNumber	- Card serial number.
outElementExists	- Defines whether outBlacklistCardElement exists or not.
outBlacklistCardElement	- Data of the blacklist element.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - function ran successfully.
- APEX_CALLBACK_STATUS_ERROR - an unexpected error occurred during the online call.

See also

[ApexCallbackStatus](#), [ApexSetCallback](#), [F_CB_CheckBlacklistCard](#), [F_CB_CheckBlacklistSam](#), [F_CB_CheckGreylist](#), [F_CB_CheckWhitelistProfile](#), [F_CB_CheckWhitelistCard](#), [F_CB_CheckGreenlist](#)

◆ F_CB_CheckBlacklistSam

```
typedef ApexCallbackStatus(CALLBACK* F_CB_CheckBlacklistSam) (void *inCallbackContext,  
T_U64 *inSamSerialNumber, T_U8 *outElementExists, ApexBlacklistSamElement  
*outBlacklistSamElement)
```

Callback to check the SAM blacklist in an environment outside APEX's configuration files.

Note

This callback must be defined in conjunction with F_CB_CheckBlacklistCard, F_CB_CheckBlacklistSam, F_CB_CheckGreylist, F_CB_CheckWhitelistProfile,

`F_CB_CheckWhitelistCard`, `F_CB_CheckGreenlist`.

If none of these callbacks are defined, APEX will use the Action Lists specified by the configuration file.

If at least one of these callbacks is not defined, an error will occur during the call to any APEX operation.

If all callbacks are defined, APEX will ignore the Action Lists specified by the configuration file and use the callbacks instead.

Parameters

`inCallbackContext` - Callback context provided by the application.

`inSamSerialNumber` - SAM serial number.

`outElementExists` - Defines whether `outBlacklistCardElement` exists or not.

`outBlacklistSamElement` - Data of the blacklist element.

Returns

APEX Callback status code. Expected return values:

- `APEX_CALLBACK_STATUS_OK` - function ran successfully.
- `APEX_CALLBACK_STATUS_ERROR` - an unexpected error occurred during the online call.

See also

[ApexCallbackStatus](#), [ApexSetCallback](#), [F_CB_CheckBlacklistCard](#),
[F_CB_CheckBlacklistSam](#), [F_CB_CheckGreylist](#), [F_CB_CheckWhitelistProfile](#),
[F_CB_CheckWhitelistCard](#), [F_CB_CheckGreenlist](#)

◆ `F_CB_CheckGreenlist`

```
typedef ApexCallbackStatus(CALLBACK* F_CB_CheckGreenlist) (void *inCallbackContext, T_S8  
inLastGreenlistItemID[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE], T_S8  
inCardTypeld[K_APEX_CARD_TYPE_ID_MAX_SIZE], T_U64 *inCardSerialNumber, T_UtilDateTime  
*inTransactionDateTime, T_U8 *outElementExists, T_U8 *outHasNext, ApexGreenlistElement  
*outGreenlistElement)
```

Callback to check the greenlist in an environment outside APEX's configuration files.

Note

This callback must be defined in conjunction with `F_CB_CheckBlacklistCard`, `F_CB_CheckBlacklistSam`, `F_CB_CheckGreylist`, `F_CB_CheckWhitelistProfile`, `F_CB_CheckWhitelistCard`, `F_CB_CheckGreenlist`.

If none of these callbacks are defined, APEX will use the Action Lists specified by the configuration file.

If at least one of these callbacks is not defined, an error will occur during the call to any APEX operation.

If all callbacks are defined, APEX will ignore the Action Lists specified by the configuration file and use the callbacks instead.

Parameters

`inCallbackContext` - Callback context provided by the application.

`inLastGreenlistItemID` - Last received greenlist item identifier. In the first call of this callback this parameter will be set to NULL.

`inCardTypeld` - Card type identifier.

`inCardSerialNumber` - Card serial number.

`inTransactionDateTime` - Date and time of the current transaction. To be used to check the temporal validity of the Whitelist elements.

`outElementExists` - Defines whether `outBlacklistCardElement` exists or not.

outHasNext	- Defines whether there are further items for the current input parameters.
outGreenlistElement	- Data of the greenlist element.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - function ran successfully.
- APEX_CALLBACK_STATUS_ERROR - an unexpected error occurred during the online call.

See also

[ApexCallbackStatus](#), [ApexSetCallback](#), [F_CB_CheckBlacklistCard](#),
[F_CB_CheckBlacklistSam](#), [F_CB_CheckGreylst](#), [F_CB_CheckWhitelistProfile](#),
[F_CB_CheckWhitelistCard](#), [F_CB_CheckGreenlist](#)

◆ F_CB_CheckGreylst

```
typedef ApexCallbackStatus(CALLBACK* F_CB_CheckGreylst) (void *inCallbackContext, T_S8
inCardTypeld[K_APEX_CARD_TYPE_ID_MAX_SIZE], T_U64 *inCardSerialNumber, T_S8
inProductLongId[K_APEX_PRODUCT_ID_MAX_SIZE], T_U32 inMachineCode, T_UtilDate
*inLoadDate, T_U32 inLoadSequenceNumber, T_U8 *outElementExists, ApexGreylstElement
*outGreylstElement)
```

Callback to check the greylst in an environment outside APEX's configuration files.

Note

This callback must be defined in conjunction with [F_CB_CheckBlacklistCard](#),
[F_CB_CheckBlacklistSam](#), [F_CB_CheckGreylst](#), [F_CB_CheckWhitelistProfile](#),
[F_CB_CheckWhitelistCard](#), [F_CB_CheckGreenlist](#).

If none of these callbacks are defined, APEX will use the Action Lists specified by the configuration file.

If at least one of these callbacks is not defined, an error will occur during the call to any APEX operation.

If all callbacks are defined, APEX will ignore the Action Lists specified by the configuration file and use the callbacks instead.

Parameters

inCallbackContext	- Callback context provided by the application.
inCardTypeld	- Card type identifier.
inCardSerialNumber	- Card serial number.
inProductLongId	- Product identifier.
inMachineCode	- Identifier of the machine that loaded the product.
inLoadDate	- Product loading date.
inLoadSequenceNumber	- Product loading sequence number.
outElementExists	- Defines whether outBlacklistCardElement exists or not.
outGreylstElement	- Data of the blacklist element.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - function ran successfully.
- APEX_CALLBACK_STATUS_ERROR - an unexpected error occurred during the online call.

See also

[ApexCallbackStatus](#), [ApexSetCallback](#), [F_CB_CheckBlacklistCard](#),
[F_CB_CheckBlacklistSam](#), [F_CB_CheckGreylst](#), [F_CB_CheckWhitelistProfile](#),

F_CB_CheckWhitelistCard, F_CB_CheckGreenlist

◆ F_CB_CheckWhitelistCard

```
typedef ApexCallbackStatus(CALLBACK* F_CB_CheckWhitelistCard) (void *inCallbackContext,
T_S8 inLastWhitelistItemID[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE], T_S8
inCardTypeld[K_APEX_CARD_TYPE_ID_MAX_SIZE], T_U64 *inCardSerialNumber, T_UtilDateTime
*inTransactionDateTime, T_U8 *outElementExists, T_U8 *outHasNext, ApexWhitelistCardElement
*outWhitelistCardElement)
```

Callback to check the whitelist for a card in an environment outside APEX's configuration files.

Note

This callback must be defined in conjunction with F_CB_CheckBlacklistCard, F_CB_CheckBlacklistSam, F_CB_CheckGreylist, F_CB_CheckWhitelistProfile, F_CB_CheckWhitelistCard, F_CB_CheckGreenlist.

If none of these callbacks are defined, APEX will use the Action Lists specified by the configuration file.

If at least one of these callbacks is not defined, an error will occur during the call to any APEX operation.

If all callbacks are defined, APEX will ignore the Action Lists specified by the configuration file and use the callbacks instead.

Parameters

inCallbackContext	- Callback context provided by the application.
inLastWhitelistItemID	- Last received whitelist item identifier. In the first call of this callback this parameter will be set to NULL.
inCardTypeld	- Card type identifier.
inCardSerialNumber	- Card serial number.
inTransactionDateTime	- Date and time of the current transaction. To be used to check the temporal validity of the Whitelist elements.
outElementExists	- Defines whether outBlacklistCardElement exists or not.
outHasNext	- Defines whether there are further items for the current input parameters.
outWhitelistCardElement	- Data of the whitelist element.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - function ran successfully.
- APEX_CALLBACK_STATUS_ERROR - an unexpected error occurred during the online call.

See also

[ApexCallbackStatus](#), [ApexSetCallback](#), [F_CB_CheckBlacklistCard](#), [F_CB_CheckBlacklistSam](#), [F_CB_CheckGreylist](#), [F_CB_CheckWhitelistProfile](#), [F_CB_CheckWhitelistCard](#), [F_CB_CheckGreenlist](#)

◆ F_CB_CheckWhitelistProfile

```
typedef ApexCallbackStatus(CALLBACK* F_CB_CheckWhitelistProfile) (void *inCallbackContext,
T_S8 inLastWhitelistItemID[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE], T_U16
inProfileIdsCount, T_S8 inProfileIdsArray[K_APEX_PROFILES_MAX_SIZE]
[K_APEX_PROFILE_ID_MAX_SIZE], T_UtilDateTime *inTransactionDateTime, T_S8
```

```
inOperatorLongId[K_APEX_OPERATOR_ID_MAX_SIZE], T_U8 *outElementExists, T_U8  
*outHasNext, ApexWhitelistProfileElement *outWhitelistProfileElement)
```

Callback to check the whitelist for profile combinations in an environment outside APEX's configuration files.

Note

This callback must be defined in conjunction with F_CB_CheckBlacklistCard, F_CB_CheckBlacklistSam, F_CB_CheckGreylst, F_CB_CheckWhitelistProfile, F_CB_CheckWhitelistCard, F_CB_CheckGreenlist.
If none of these callbacks are defined, APEX will use the Action Lists specified by the configuration file.
If at least one of these callbacks is not defined, an error will occur during the call to any APEX operation.
If all callbacks are defined, APEX will ignore the Action Lists specified by the configuration file and use the callbacks instead.

Parameters

inCallbackContext	- Callback context provided by the application.
inLastWhitelistItemID	- Last received whitelist item identifier. In the first call of this callback this parameter will be set to NULL.
inProfileIdsCount	- Number of elements in the parameter inProfileIdsArray.
inProfileIdsArray	- Array containing the identifier strings of the card's profiles.
inTransactionDateTime	- Date and time of the current transaction. To be used to check the temporal validity of the Whitelist elements.
inOperatorLongId	- Operator identifier.
outElementExists	- Defines whether outBlacklistCardElement exists or not.
outHasNext	- Defines whether there are further items for the current input parameters.
outWhitelistProfileElement	- Data of the whitelist element.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - function ran successfully.
- APEX_CALLBACK_STATUS_ERROR - an unexpected error occurred during the online call.

See also

[ApexCallbackStatus](#), [ApexSetCallback](#), [F_CB_CheckBlacklistCard](#),
[F_CB_CheckBlacklistSam](#), [F_CB_CheckGreylst](#), [F_CB_CheckWhitelistProfile](#),
[F_CB_CheckWhitelistCard](#), [F_CB_CheckGreenlist](#)

◆ F_CB_ConfirmCancel

```
typedef ApexCallbackStatus(CALLBACK* F_CB_ConfirmCancel) (void *inCallbackContext,  
ApexCardInfo *inCardInfo, ApexConfirmCancelInfo *inCancelInfo)
```

Callback to confirm the contract cancellation. This callback is invoked before APEX changes any data on the card.

Parameters

inCallbackContext	- Callback context provided by the application.
inCardInfo	- Card identification.
inCancelInfo	- Contains information about the contract cancellation that will be done.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - cancellation can continue.
- APEX_CALLBACK_STATUS_CANCEL - request to abort the cancellation operation.

See also

[ApexCallbackStatus](#), [ApexCardInfo](#), [ApexConfirmCancelInfo](#), [ApexSetCallback](#)

◆ F_CB_ConfirmTransfer

```
typedef ApexCallbackStatus(CALLBACK* F_CB_ConfirmTransfer) (void *inCallbackContext,  
ApexCardInfo *inCardInfo, ApexConfirmTransferInfo *inTransferInfo)
```

Callback to confirm the contract transfer execution. This callback is invoked before APEX changes any data on the card.

Parameters

- inCallbackContext** - Callback context provided by the application.
inCardInfo - Card identification.
inTransferInfo - Contains information about the contract transfer that will be done.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - transfer can continue.
- APEX_CALLBACK_STATUS_CANCEL - request to abort the transfer operation.

See also

[ApexCallbackStatus](#), [ApexCardInfo](#), [ApexConfirmTransferInfo](#), [ApexSetCallback](#)

◆ F_CB_ConfirmValidation

```
typedef ApexCallbackStatus(CALLBACK* F_CB_ConfirmValidation) (void *inCallbackContext,  
ApexCardInfo *inCardInfo, ApexConfirmValidationInfo *inValidationInfo)
```

Callback to confirm the validation execution. This callback is invoked before APEX changes any data on the card. This callback is useful for bi-directional gates where it is necessary to confirm that the passage channel is free.

Parameters

- inCallbackContext** - Callback context provided by the application.
inCardInfo - Card identification.
inValidationInfo - Contains information about the validation that will be done.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - validation can continue.
- APEX_CALLBACK_STATUS_CANCEL - request to abort the validation operation.

See also

[ApexCallbackStatus](#), [ApexCardInfo](#), [ApexConfirmValidationInfo](#), [ApexSetCallback](#)

◆ F_CB_GetLoadSequenceId

```
typedef ApexCallbackStatus(CALLBACK* F_CB_GetLoadSequenceId) (void *inCallbackContext,  
T_U32 inMachineCode, T_CardDataModel inCardDataModel, T_U16 *outNumDaily)
```

Callback to get the current daily number of operations for a specific machine. This value is written on the card.

Parameters

- inCallbackContext** - Callback context provided by the application.
- inMachineCode** - Machine code.
- inCardDataModel** - Card data model.
- outNumDaily** - Number of current daily operations for the machine.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - function ran successfully.

See also

[ApexCallbackStatus](#), [ApexSetCallback](#)

◆ F_CB_PostValidation

```
typedef ApexCallbackStatus(CALLBACK* F_CB_PostValidation) (void *inCallbackContext,  
ApexCardInfo *inCardInfo, ApexValidationInfo *inValidationInfo)
```

Callback that provides information about the validation made. This callback is always invoked, except when an internal error occurs during the validation flow. In other words, when [ApexValidate\(\)](#) is called, this callback will be invoked whether the card was accepted or rejected by the validation.

Parameters

- inCallbackContext** - Callback context provided by the application.
- inCardInfo** - Card identification.
- inValidationInfo** - Contains information about the validation performed.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - function ran successfully.

See also

[ApexCallbackStatus](#), [ApexCardInfo](#), [ApexValidationInfo](#), [ApexSetCallback](#), [ApexValidate](#)

◆ F_CB_TransactionReport

```
typedef ApexCallbackStatus(CALLBACK* F_CB_TransactionReport) (void *inCallbackContext,  
ApexTransactionType inTransactionType, T_U16 inTransactionSize, T_S8 *inTransaction)
```

Callback to report to the application the transactions performed during the execution of a given operation.

Parameters

- inCallbackContext** - Callback context provided by the application.
- inTransactionType** - Indicates the transaction type.
- inTransactionSize** - Indicates the size of the transaction record.
- inTransaction** - Contains the transaction record (NULL terminator included).

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - function ran successfully.

See also

[ApexCallbackStatus](#), [ApexTransactionType](#), [ApexSetCallback](#)

◆ F_CB_WebService

```
typedef ApexCallbackStatus(CALLBACK* F_CB_WebService) (void *inCallbackContext, const T_S8 *inBodyContent, const T_S8 *inHttpHeaders, const T_S8 *inURL, T_U32 *inOutResponseLength, T_S8 *outResponse, T_U16 *outHttpStatus)
```

Callback to get online access. This callback is used to do an online check on greenlist load operations.

Parameters

- inCallbackContext** - Callback context provided by the application.
- inURL** - Web Service URL (Uniform Resource Locator).
- inHttpHeaders** - HTTP headers, using '
' character to separate the headers. Example: "Content-Type:application/application/json\nheader_field_1:Value_1\nheader_field_2:Value_2"
- inBodyContent** - HTTP body content.
- inOutResponseSize** - [IN] Maximum length for the response contents (NULL terminator NOT included).
[OUT] Length of the response contents (NULL terminator NOT included).
If the callback returns the error APEX_CALLBACK_STATUS_ERROR and the inOutResponseLength is greater than the initial value, it means that the current response buffer is insufficient and that the variable has been set to the required buffer size. API-APEX will allocate a new response buffer and call again this callback.
- outResponse** - Response content. Buffer pre-allocated by API-APEX.
- outHttpStatus** - HTTP status code.

Returns

APEX Callback status code. Expected return values:

- APEX_CALLBACK_STATUS_OK - function ran successfully.
- APEX_CALLBACK_STATUS_ERROR - an unexpected error occurred during the online call.

See also

[ApexCallbackStatus](#), [ApexSetCallback](#)

Variable Documentation

◆ actionListsFullFilename [1/2]

T_S8 actionListsFullFilename[K_APEX_FILE_PATH_MAX_SIZE]

Name and path of the action lists configuration file.

◆ actionListsFullFilename [2/2]

T_S8 actionListsFullFilename[K_APEX_FILE_PATH_MAX_SIZE]

Name and path of the action lists configuration file.

◆ allowsReloadFlag

T_U8 allowsReloadFlag

Indicates whether this contract can currently be reloaded.

Takes into consideration whether the contract normally supports the reload operation as well as its current and max number of units.

◆ antennaNumber

T_U8 antennaNumber

Antenna number.

◆ antipassbackMode [1/2]

ApexAntipassbackMode antipassbackMode

Anti-passback mode to be used for the whitelist element.

◆ antipassbackMode [2/2]

ApexAntipassbackMode antipassbackMode

Anti-passback mode to be used for the whitelist element.

◆ apexDetailedStatus

[ApexDetailedStatus](#) apexDetailedStatus

Identifies how the low level error structure should be interpreted.

See also

[ApexDetailedStatus](#)

◆ apexMinVersion

T_S8 apexMinVersion[[K_APEX_LIBRARY_VERSION_MAX_SIZE](#)]

API-APEX version.

Template: MMM.mmm.rrr

MMM - major.

mmm - minor.

rrr - revision.

◆ apexStatus

[ApexStatus](#) apexStatus

Status codes returned by the API-APEX functions.

See also

[ApexStatus](#)

◆ applicationIssuerCode

T_U16 applicationIssuerCode

Application issuer operator code.

This code is printed on the card in conjunction with the cardNumber. This field is only used in read and control operations. It is defined in the Technical Parameters configuration file.

◆ applicationIssuerId

T_S8 applicationIssuerId[[K_APEX_OPERATOR_ID_MAX_SIZE](#)]

Application issuer operator identifier.

This field is only used in read and control operations. It is defined in the Technical Parameters configuration file.

◆ applicationIssuerName

T_S8 applicationIssuerName[K_APEX_OPERATOR_NAME_MAX_SIZE]

Application issuer operator name.

This field is only used in read and control operations. It is defined in the Technical Parameters configuration file.

◆ applicationIssuerShortName

T_S8 applicationIssuerShortName[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE]

Application issuer operator short name.

This field is only used in read and control operations. It is defined in the Technical Parameters configuration file.

◆ attachedDocumentName

T_S8 attachedDocumentName[K_APEX_DOCUMENT_NAME_MAX_SIZE]

Attached document name.

◆ attachedDocumentObs

T_S8 attachedDocumentObs[K_APEX_DOCUMENT_OBS_MAX_SIZE]

Observations on the attached document.

◆ attachedDocumentType

ApexDocumentType attachedDocumentType

Attached document type.

◆ authorizationId

T_S8 authorizationId[K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_SIZE]

Authorization identifier.

◆ availableZonesArray

ApexZone* availableZonesArray

Array of zones where the product is valid (dynamically allocated).

◆ availableZonesCount

T_U16 availableZonesCount

Number of elements in the available zones array.

◆ binaryData

T_U8 binaryData[K_APEX_BINARY_MAX_SIZE]

Array containing the binary data.

◆ binaryDataSize

T_U16 binaryDataSize

Size of binaryData.

◆ cacheOptimizationFlag [1/2]

T_U8 cacheOptimizationFlag

Optimizes the operation using the cached data of the last card read with [ApexRead\(\)](#).

If set to TRUE and cardFilterFlag is enabled, ApexGetCatalog will use the cached data from the previously card read, if available. If set to FALSE and cardFilterFlag is enabled, ApexGetCatalog will read the data from the card detected.

Ignored if cardFilterFlag is disabled.

See also

[ApexRead](#)

◆ cacheOptimizationFlag [2/2]

T_U8 cacheOptimizationFlag

Optimizes the configuration process using the cached data of the last card read with [ApexRead\(\)](#).

If set to TRUE, [ApexConfigureProduct\(\)](#) will use the cached data from the previously card read, if available. If set to FALSE, [ApexConfigureProduct\(\)](#) will detect and read the card on the first call.

See also

[ApexRead](#)

◆ calypsoNativeMode

T_CalypsoNativeMode calypsoNativeMode

Card reader Calypso Mode.

Specifies whether or not the card reader supports native calypso operations.

◆ cardBlacklistItemId

T_S8 cardBlacklistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]

Identifier of the blacklist element.

◆ cardData

[ApexCardData](#) cardData

Contains the card data structures.

◆ cardDataModel [1/2]

T_CardDataModel cardDataModel

Card data model.

Note

The card data model is required to know how to interpret the [ApexCardData](#).

See also

[ApexCardData](#)

◆ cardDataModel [2/2]

T_CardDataModel cardDataModel

Card data model.

◆ cardFamily

T_CardFamily cardFamily

Family of the detected card.

◆ cardFilterFlag

T_U8 cardFilterFlag

Filter catalog based on the card read. Only products suitable for the card are returned.

◆ cardInfo [1/2]

T_U8 cardInfo[K_APEX_SELECT_APP_INFO_MAX_SIZE]

Contains the card initial information. This information depends upon the type of the card detected:

- Answer to the select application command for a LisboaViva or Viva Card.
- Full binary content for any supported ticket

◆ cardInfo [2/2]

ApexCardInfo cardInfo

Card information and details.

◆ cardInfoLength

T_U16 cardInfoLength

Length of the cardInfo byte array.

- Up to K_INFO_MAX_LENGTH bytes for a LisboaViva or Viva Card
- 64 bytes for a CTS512B, HCE or Mifare UL
- 68 bytes for a SRT512B <4 bytes for the system area plus 64 bytes of ticket content>

- 32 bytes for a CTS256B

◆ **cardIssuer**

T_U8 cardIssuer

Card issuer.

◆ **cardNumber [1/2]**

T_U32 cardNumber

Unique card number by issuer.

This code is printed on the card in conjunction with the applicationIssuerCode.

◆ **cardNumber [2/2]**

T_U32 cardNumber

Card number.

◆ **cardPhysicalType [1/2]**

T_CardPhysicalType cardPhysicalType

Card physical type.

◆ **cardPhysicalType [2/2]**

T_CardPhysicalType cardPhysicalType

Physical type of the detected card.

◆ **cardSerialNumber [1/7]**

T_U64 cardSerialNumber

Card serial number.

The card serial number is composed of two T_U32: the high and low parts

◆ cardSerialNumber [2/7]

T_U64 cardSerialNumber

Serial number of the detected card.

◆ cardSerialNumber [3/7]

T_U64 cardSerialNumber

Card serial number.

◆ cardSerialNumber [4/7]

T_U64 cardSerialNumber

Card serial number.

◆ cardSerialNumber [5/7]

T_U64 cardSerialNumber

Card serial number.

◆ cardSerialNumber [6/7]

T_U64 cardSerialNumber

Card serial number.

◆ cardSerialNumber [7/7]

T_U64 cardSerialNumber

Card serial number.

◆ cardTypeId [1/7]

T_S8 cardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Card type identifier.

This ID matches one defined in the Technical Parameters configuration file.

◆ **cardTypId** [2/7]

T_S8 cardTypId[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Identifier of the damaged card's type.

◆ **cardTypId** [3/7]

T_S8 cardTypId[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Card type ID.

This field is used in conjunction with
ApexProductConfigureMode.APEX_CONFIGURE_PRODUCT_MODE_TRANSFER_BINARY.

Note

Once a configurationId is generated, this input parameter may not be changed.

See also

[ApexProductConfiguration](#)

◆ **cardTypId** [4/7]

T_S8 cardTypId[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Card type identifier.

◆ **cardTypId** [5/7]

T_S8 cardTypId[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Card type identifier.

◆ **cardTypId** [6/7]

T_S8 cardTypId[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Card type identifier.

◆ **cardTypeld** [7/7]

T_S8 cardTypeld[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Card type identifier.

◆ **cardTypeldsArray**

ApexCardTypeld* cardTypeldsArray

Array of card types valid for the product.

◆ **cardTypeldsCount**

T_U16 cardTypeldsCount

Number of elements in the card type ids array.

◆ **cardValidityState** [1/2]

T_CardValidityState cardValidityState

Indicates whether or not the card is valid.

◆ **cardValidityState** [2/2]

T_CardValidityState cardValidityState

Indicates whether the card is in a valid state or if the application has been invalidated.

◆ **channelId** [1/3]

T_S8 channelId[K_APEX_CHANNEL_ID_MAX_SIZE]

Channel identifier. This ID must match one defined in the commercial offer configuration file.

◆ **channelId** [2/3]

T_S8 channelId[K_APEX_CHANNEL_ID_MAX_SIZE]

Channel identifier. This ID must match one defined in the commercial offer configuration file.

◆ **channelId** [3/3]

T_S8 channelId[K_APEX_CHANNEL_ID_MAX_SIZE]

Channel identifier. This ID must match one defined in the commercial offer configuration file.

◆ **characteristics**

ApexContractCharacteristics characteristics

Contract characteristics.

◆ **civilNumber**

T_U32 civilNumber

Holder civil number.

◆ **clientLevel**

T_U8 clientLevel

Loyalty level of the client.

◆ **comOfferFullFilename** [1/2]

T_S8 comOfferFullFilename[K_APEX_FILE_PATH_MAX_SIZE]

Name and path of the commercial offer configuration file.

◆ **comOfferFullFilename** [2/2]

T_S8 comOfferFullFilename[K_APEX_FILE_PATH_MAX_SIZE]

Name and path of the commercial offer configuration file.

◆ **configId**

T_S8 configId[K_APEX_GENERIC_ID_MAX_SIZE]

Internal APEX reference identifier.

This field is used internally by APEX and must not be changed by the application. It may be empty, unique or repeated.

◆ configurationId [1/2]

T_S8 configurationId[K_APEX_CONFIGURATION_ID_MAX_SIZE]

Used to identify the product configuration during [ApexLoad\(\)](#) or [ApexTransfer\(\)](#).

◆ configurationId [2/2]

T_S8 configurationId[K_APEX_CONFIGURATION_ID_MAX_SIZE]

Used to identify the Pre-Selection configuration during [ApexPreSelection\(\)](#).

◆ configureMode

ApexConfigureProductMode configureMode

[ApexConfigureProduct\(\)](#) mode of operation.

Note

Once a configurationId is generated, this input parameter may not be changed.

See also

[ApexProductConfiguration](#)

◆ contractBinariesArray

ApexBinary contractBinariesArray[K_APEX_CONTRACTS_MAX_SIZE]

Array of contract binaries (sparse array).

◆ contractBinary

ApexBinary contractBinary

Contract binary.

This field is used in conjunction with `ApexProductConfigureMode.APEX_CONFIGURE_PRODUCT_MODE_TRANSFER_BINARY`.

Note

Once a configurationId is generated, this input parameter may not be changed.

See also

[ApexProductConfiguration](#)

◆ **contractDuration**

`T_U16 contractDuration`

Contract duration value.

◆ **contractDurationType**

`ApexContractDurationType contractDurationType`

Contract duration type. Gives meaning to the `contractDuration` field.

◆ **contractInGreylistFlag**

`T_U8 contractInGreylistFlag`

Indicates whether or not the contract is present in the greylist.

The contract is present in the greylist if this value is set to TRUE (1) and not present if set to FALSE (0).

◆ **contractNumber [1/3]**

`T_U16 contractNumber`

Contract number.

◆ **contractNumber [2/3]**

`T_U8 contractNumber`

Contract number.

◆ **contractNumber** [3/3]

T_U8 contractNumber

Contract number (starting from 1) of the contract to which the pre-selection is going to be applied.

◆ **contractsArray**

ApexContract* contractsArray

Array of contracts (dynamically allocated).

◆ **contractsCount**

T_U16 contractsCount

Number of elements in the contracts array.

◆ **contractsInGreenlistFlag**

T_U8 contractsInGreenlistFlag

Indicates whether or not the card has greenlist contracts waiting to be loaded.

The card has at least one valid contract present in the greenlist if this value is set to TRUE (1) and no valid contracts if set to FALSE (0).

Only used if the current greenlist behaviour is set to APEX_GREENLIST_BEHAVIOR_INFO.

◆ **contractStartDate**

T_UtilDateTime contractStartDate

Start date of the greenlist element contract.

◆ **contractStatus**

ApexControlContractStatus contractStatus

Contract control status.

Should be set to 0 in order to ignore contract related infractions.

◆ contractStatusArray

ApexControlContractStatus contractStatusArray[K_APEX_CONTRACTS_MAX_SIZE]

Each element of the contractStatusArray identifies the control status of the respective contract present in the cardData.contractsArray.

◆ contractStatusCount

T_U16 contractStatusCount

Number of elements in the contract status array.

◆ contractStatusMask

T_U8 contractStatusMask[APEX_CONTROL_CONTRACT_STATUS_MAX_VALUE]

Array of booleans indicating which contract status are associated. Each index of the array is directly associated to an ApexControlContractStatus value.

◆ contractsUsedMask [1/2]

T_U16 contractsUsedMask

Mask with the contracts used in the validation.

Note

For cards with the ticket data model, this field is always 0.

◆ contractsUsedMask [2/2]

T_U16 contractsUsedMask

Mask with the contracts used in the validation.

◆ contractUnits

T_U32 contractUnits

Contract units.

◆ controllerDocumentType

ApexDocumentType controllerDocumentType

Identification document type of the controller.

◆ controllerIdentityNumber

T_S8 controllerIdentityNumber[K_APEX_IDENTITY_NUMBER_MAX_SIZE]

Identity number of the controller.

◆ controlStatus

ApexControlStatus controlStatus

Status code with the overall result of the control.

◆ countryCode

T_U16 countryCode

Country ISO-3166 code.

◆ couplerConfiguration [1/2]

T_CouplerConfiguration* couplerConfiguration

Pointer to the structure with the Coupler Configuration.

If the value of the pointer is NULL then it will be used the API-VIVA default values.

◆ couplerConfiguration [2/2]

T_CouplerConfiguration* couplerConfiguration

Pointer to the structure with the Coupler Configuration.

If the value of the pointer is NULL then it will be used the API-VIVA default values.

◆ cscType [1/2]

T_CscType cscType

Reader CSC/Coupler type.

Informs the API VIVA which coupler type it will be handling. In the case of K_CSC_TYPE_CNA, the communication with the card reader becomes the responsibility of the application, which must implement the necessary reader communication callbacks.

See also

[ApexSetCallback](#)

◆ cscType [2/2]

T_CscType cscType

Reader CSC/Coupler type.

Informs the API VIVA which coupler type it will be handling. In the case of K_CSC_TYPE_CNA, the communication with the SAM reader becomes the responsibility of the application, which must implement the necessary reader communication callbacks.

See also

[ApexSetCallback](#)

◆ currencyCode

T_U16 currencyCode

Currency ISO-4217 code.

◆ dailyUsageRate

T_U16 dailyUsageRate

Amount in cents to charge for each day of usage.

◆ dailyUsageValue

T_S32 dailyUsageValue

Total amount, in cents, of the daily usage value calculated by the product's corresponding daily usage rate.

◆ **dateTimeValue**

T_UtilDateTime dateTimeValue

Date and time value configuration for the parameter.

◆ **decrementedUnits**

T_U32 decrementedUnits

Number of units decremented (present if unitType is not NONE).

◆ **description [1/5]**

T_S8 description[K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_SIZE]

Infraction attribute description.

◆ **description [2/5]**

T_S8 description[K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_SIZE]

Fine attribute description.

◆ **description [3/5]**

T_S8 description[K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE]

Description of the product category.

◆ **description [4/5]**

T_S8 description[K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE]

Infraction description.

◆ **description [5/5]**

T_S8 description[K_APEX_FINE_DESCRIPTION_MAX_SIZE]

Fine description.

◆ destinationZone

ApexZone destinationZone

Destination zone.

Valid on all zones if empty.

◆ destinationZoneld

T_S8 destinationZoneld[K_APEX_ZONE_ID_MAX_SIZE]

Destination zone identifier.

This field is only available when the event is of type Pre-selection.

◆ destinationZoneName

T_S8 destinationZoneName[K_APEX_ZONE_NAME_MAX_SIZE]

Destination zone name.

◆ destinationZonesArray

ApexZone* destinationZonesArray

Array containing all available destination zones for the currently selected origin zone.

◆ destinationZonesCount

T_U16 destinationZonesCount

Number of elements of the destinationZonesArray.

◆ destinationZoneSelectedIndex

T_U16 destinationZoneSelectedIndex

Selected destination zone index.

◆ **deviceId** [1/4]

T_U32 deviceId

Device identifier.

◆ **deviceId** [2/4]

T_U32 deviceId

Device identifier.

◆ **deviceId** [3/4]

T_S8 deviceId[K_APEX_DEVICE_ID_MAX_SIZE]

Device point of sale identifier.

◆ **deviceId** [4/4]

T_S8 deviceId[K_APEX_DEVICE_ID_MAX_SIZE]

Device point of sale identifier.

◆ **endDate** [1/6]

T_UtilDate endDate

Profile expiration date.

◆ **endDate** [2/6]

T_UtilDate endDate

Application expiration date.

◆ **endDate** [3/6]

T_UtilDate endDate

End date of the loyalty data.

◆ **endDate** [4 / 6]

T_UtilDateTime endDate

End date of the blacklist element effective period (inclusive).

◆ **endDate** [5 / 6]

T_UtilDateTime endDate

End date of the whitelist element effective period (inclusive).

◆ **endDate** [6 / 6]

T_UtilDateTime endDate

End date of the whitelist element effective period (inclusive).

◆ **environment**

ApexEnvironment environment

Specifies the public transport network environment and holder profiles, in which the card is used.

◆ **environmentBinary**

ApexBinary environmentBinary

Environment binary data.

◆ **environmentStatus** [1 / 2]

ApexControlEnvironmentStatus environmentStatus

Indicates the status of the control operation over the environment data.

◆ **environmentStatus** [2 / 2]

ApexControlEnvironmentStatus environmentStatus

Environment control status.

Should be set to 0 in order to ignore environment related infractions.

◆ environmentStatusMask

T_U8 environmentStatusMask[APEX_CONTROL_ENVIRONMENT_STATUS_MAX_VALUE]

Array of booleans indicating which environment status are associated. Each index of the array is directly associated to an ApexControlEnvironmentStatus value.

◆ errorType

ApexLowLevelErrorType errorType

Identifies how the low level error structure should be interpreted.

See also

[ApexLowLevelErrorType](#)

◆ event

ApexEvent event

Transport event data structure (most recent event).

◆ eventBinary

ApexBinary eventBinary

Event binary data.

◆ eventContractUsageArray [1/2]

ApexEventContractUsage* eventContractUsageArray

Event contract usage data structure (dynamically allocated).

◆ eventContractUsageArray [2/2]

ApexEventContractUsage* eventContractUsageArray

Event contract usage data structure (dynamically allocated).

◆ **eventContractUsageCount** [1/2]

T_U16 eventContractUsageCount

Number of elements in the event contract usage array.

◆ **eventContractUsageCount** [2/2]

T_U16 eventContractUsageCount

Number of elements in the event contract usage array.

◆ **eventDateTime** [1/2]

T_UtilDateTime eventDateTime

Date and time of the event.

◆ **eventDateTime** [2/2]

T_UtilDateTime eventDateTime

Date and time of the event.

◆ **eventOperatorId** [1/2]

T_S8 eventOperatorId[K_APEX_OPERATOR_ID_MAX_SIZE]

Event operator identifier.

◆ **eventOperatorId** [2/2]

T_S8 eventOperatorId[K_APEX_OPERATOR_ID_MAX_SIZE]

Event operator identifier.

◆ **eventType** [1/3]

T_VivaEventType eventType

Type of the event.

◆ **eventType** [2/3]

T_VivaEventType eventType

Type of the event.

◆ **eventType** [3/3]

T_VivaEventType eventType

Event type (entry, exit, ...).

◆ **exitDateLimit**

T_UtilDate exitDateLimit

Date limit for the exit.

◆ **exitTimeLimit**

T_UtilTime exitTimeLimit

Time limit for the exit.

◆ **expirationDate**

T_UtilDateTime expirationDate

Expiration date.

◆ **fileDate**

T_UtilDateTime fileDate

File generation date.

◆ fileEndDate

T_UtilDateTime fileEndDate

File validity end date.

◆ fileFormatVersion

T_S8 fileFormatVersion[[K_APEX_FILE_VERSION_MAX_SIZE](#)]

File format version.

Template: MMM.mmm

MMM - major.

mmm - minor.

◆ fileStartDate

T_UtilDateTime fileStartDate

File validity start date.

◆ fileVersion

T_S8 fileVersion[[K_APEX_FILE_VERSION_MAX_SIZE](#)]

File version.

Template: MMM.mmm

MMM - major.

mmm - minor.

◆ finalDateTime

T_UtilDateTime finalDateTime

Final date/time of the trip.

◆ fineAmount

T_S32 fineAmount

Fine amount applied.

◆ fineAttributId

T_S8 fineAttributId[K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE]

Fine attribute identifier.

Ignored if empty.

◆ fineAttributesArray

ApexFineAttribute* fineAttributesArray

Array of fine attributes.

◆ fineAttributesCount

T_U16 fineAttributesCount

Number of elements in the fine attributes array.

◆ finId

T_S8 finId[K_APEX_FINE_ID_MAX_SIZE]

Fine identifier.

◆ fineOperatorId

T_S8 fineOperatorId[K_APEX_OPERATOR_ID_MAX_SIZE]

Operator entity code.

◆ firstDateTime

T_UtilDateTime firstDateTime

Date and time of the latest trip.

◆ graphicalLayout

T_VivaGraphicalLayout graphicalLayout

Graphical layout of the card.

◆ greenlistItemId

T_S8 greenlistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]

Identifier of the greenlist element.

◆ greylistItemId

T_S8 greylistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]

Identifier of the greylist element.

◆ groupDimension [1/3]

T_U8 groupDimension

Group dimension in case of a group contract.

◆ groupDimension [2/3]

T_U8 groupDimension

Group dimension.

◆ groupDimension [3/3]

T_U8 groupDimension

Group dimension.

◆ groupFlag

T_U8 groupFlag

Defines whether the product is a group ticket or not.

◆ hasCardDataModel

T_U8 hasCardDataModel

Indicates if the "cardDataModel" field was set.

◆ hasEndDate [1/3]

T_U8 hasEndDate

Indicates if the "endDate" field was set.

◆ hasEndDate [2/3]

T_U8 hasEndDate

Indicates if the "endDate" field was set.

◆ hasEndDate [3/3]

T_U8 hasEndDate

Indicates if the "endDate" field was set.

◆ hasLoadDate

T_U8 hasLoadDate

Indicates if the "loadDate" field was set.

◆ hasLoadSequenceNumber

T_U8 hasLoadSequenceNumber

Indicates if the "loadSequenceNumber" field was set.

◆ **hasMachineCode**

T_U8 hasMachineCode

Indicates if the "machineCode" field was set.

◆ **hasPhysicalSupport**

T_U8 hasPhysicalSupport

Defines whether the product sale/load requires the sale of a physical support.

◆ **hasStartDate**

T_U8 hasStartDate

Indicates if the "startDate" field was set.

◆ **holderBirthDate**

T_UtilDate holderBirthDate

Holder birth date.

◆ **holderCompany**

T_U16 holderCompany

Identifier of the company where the holder works.

◆ **holderCompanyName**

T_S8 holderCompanyName[K_APEX_OPERATOR_NAME_MAX_SIZE]

Name of the company where the holder works.

This field is only used in read and control operations.

◆ **holderCompanyShortName**

T_S8 holderCompanyShortName[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE]

Short name of the company where the holder works.

This field is only used in read and control operations.

◆ holderId

ApexHolderId holderId

Card holder identification.

◆ holderIdBinary

ApexBinary holderIdBinary

Holder ID binary data.

◆ holderNumber

T_U32 holderNumber

Holder number.

◆ id [1/7]

T_S8 id[K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE]

Infraction attribute identifier.

◆ id [2/7]

T_S8 id[K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE]

Fine attribute identifier.

◆ id [3/7]

T_U8 id

Arbitrary ID of the card reader.

This is an arbitrary ID given by the application, which is used to identify the card reader during the call to [ApexAddCardSamAssociation\(\)](#).

See also

[ApexAddCardSamAssociation](#)

◆ **id** [4/7]

T_U8 id

Arbitrary ID of the SAM reader.

This is an arbitrary ID given by the application, which is used to identify the SAM reader during the call to [ApexAddCardSamAssociation\(\)](#).

See also

[ApexAddCardSamAssociation](#)

◆ **id** [5/7]

T_S8 id[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Identifier of the card type.

◆ **id** [6/7]

T_S8 id[K_APEX_INFRACTION_ID_MAX_SIZE]

Infraction identifier.

◆ **id** [7/7]

T_S8 id[K_APEX_FINE_ID_MAX_SIZE]

Fine identifier.

◆ **includePatternsFlag**

T_U8 includePatternsFlag

Defines whether the output contains the patterns for each line.

◆ includeStopsFlag

T_U8 includeStopsFlag

Defines whether the output contains the stops for each pattern.

This parameter is discarded if inIncludePatternsFlag is set to FALSE.

◆ infractionAttributId

T_S8 infractionAttributId[K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE]

Infraction attribute identifier.

Ignored if empty.

◆ infractionAttributesArray

ApexInfractionAttribute* infractionAttributesArray

Array of infraction attributes.

◆ infractionAttributesCount

T_U16 infractionAttributesCount

Number of elements in the infraction attributes array.

◆ infractionDate

T_UtilDateTime infractionDate

Infraction date.

◆ infractionDescription

T_S8 infractionDescription[K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE]

Infraction description.

◆ **infractionId** [1/2]

T_S8 infractionId[K_APEX_INFRACTION_ID_MAX_SIZE]

Infraction identifier.

◆ **infractionId** [2/2]

T_S8 infractionId[K_APEX_INFRACTION_ID_MAX_SIZE]

Infraction identifier.

Ignored if empty.

◆ **infractionNoticeDate**

T_UtilDateTime infractionNoticeDate

Date of the emission of the fine.

◆ **infractionNumber**

T_S8 infractionNumber[K_APEX_INFRACTION_NUMBER_MAX_SIZE]

Infraction fine number.

◆ **infractionPlace**

T_S8 infractionPlace[K_APEX_INFRACTION_PLACE_MAX_SIZE]

Locality where the infraction took place.

◆ **infractionsArray**

ApexInfraction* infractionsArray

Array of infractions.

◆ **infractionsCount**

T_U16 infractionsCount

Number of elements in the infractions array.

◆ initialDateTime**T_UtilDateTime initialDateTime**

Initial date/time of the trip.

◆ interchangeAllowedFlag**T_U8 interchangeAllowedFlag**

Flag that defines whether interchange is allowed.

◆ invoiceNumber**T_S8 invoiceNumber[K_APEX_INVOICE_NUMBER_MAX_SIZE]**

Invoice number.

◆ isODPreSelectionFlag [1/2]**T_U8 isODPreSelectionFlag**

Specifies an origin/destination or contract pre-selection.

◆ isODPreSelectionFlag [2/2]**T_U8 isODPreSelectionFlag**

Informs whether the current configuration requires a selection of the Origin and Destination zones.

◆ isSelectedFlag [1/3]**T_U8 isSelectedFlag**

Indicates whether this element has been selected as one of the loading configuration choices.

◆ **isSelectedFlag** [2/3]

T_U8 isSelectedFlag

Indicates whether this element has been selected as the loading configuration choice.

◆ **isSelectedFlag** [3/3]

T_U8 isSelectedFlag

Indicates whether this element has been selected as the loading configuration choice.

◆ **issueEnvironment**

ApexEnvironment issueEnvironment

Environment data for card issuing.

◆ **issueHolderId**

ApexHolderId issueHolderId

Holder data for card issuing.

◆ **issueMode**

ApexIssueMode issueMode

Identifies the data structures that will written/updated during the issue operation.

◆ **issuerData** [1/3]

T_U8 issuerData[K_APEX_ISSUER_DATA_MAX_SIZE]

Issuer specific data.

For Lisboa Viva Cards and card with Data Model v1, the first 3 bytes of the issuer data represent the value of the 5th counter, with index 0 representing the most significant byte and index 2 representing the least significant byte. In this case, issuerDataSize should be set to 24 (bits)

Example: if it is intended to write the number 0x112233 to the 5th counter, issuerData should be as follows:

issuerData[0] = 0x11

issuerData[1] = 0x22
issuerData[2] = 0x33

◆ **issuerData** [2/3]

T_U8 issuerData[K_APEX_ISSUER_DATA_MAX_SIZE]

Issuer specific data.

◆ **issuerData** [3/3]

T_U8 issuerData[K_APEX_ISSUER_DATA_MAX_SIZE]

Issuer specific data.

◆ **issuerDataSize** [1/3]

T_U8 issuerDataSize

Issuer data size (in bits).

◆ **issuerDataSize** [2/3]

T_U8 issuerDataSize

Issuer data size (in bits).

◆ **issuerDataSize** [3/3]

T_U8 issuerDataSize

Issuer data size (in bits).

◆ **issuingDate**

T_UtilDate issuingDate

Application issuing date.

◆ isValid

T_U8 isValid

Informs whether the current configuration is valid or not. Only a valid configuration will be accepted by [ApexPreSelection\(\)](#).

◆ journeyInterchanges

T_U8 journeyInterchanges

Interchange counter.

◆ kvc

T_U8 kvc

Key version and category of the selected application.

◆ level

T_U16 level

Arbitrary level.

E.g. A product may have 2 product categories:

- level = 1, description = "Monthly ticket"
- level = 2, description = "Metropolitan area"

While another may have the categories:

- level = 1, description = "Monthly ticket"
- level = 2, description = "City area"

◆ line

[ApexLine](#) line

Line.

Valid on all lines if empty.

◆ **lineId** [1/4]

T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE]

Line identifier.

◆ **lineId** [2/4]

T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE]

Line identifier.

◆ **lineId** [3/4]

T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE]

Line identifier.

◆ **lineId** [4/4]

T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE]

Line filter.

Ignored if empty.

◆ **lineInfoArray**

ApexLineInfo* lineInfoArray

Array of line.

◆ **lineInfoCount**

T_U16 lineInfoCount

Number of elements in the lines array.

◆ **lineName** [1/4]

T_S8 lineName[K_APEX_LINE_NAME_MAX_SIZE]

Line name.

◆ **lineName** [2/4]

T_S8 lineName[K_APEX_LINE_NAME_MAX_SIZE]

Line name.

◆ **lineName** [3/4]

T_S8 lineName[K_APEX_LINE_NAME_MAX_SIZE]

Line name.

◆ **lineName** [4/4]

T_S8 lineName[K_APEX_LINE_NAME_MAX_SIZE]

Line name.

◆ **loadDate**

T_UtilDate loadDate

Ticket load date.

◆ **loadEndDate**

T_UtilDate loadEndDate

Last valid day for the increase of the loyalty counter.

◆ **loadSequenceNumber**

T_U16 loadSequenceNumber

Ticket load sequence number.

◆ locationFilterFlag

T_U8 locationFilterFlag

Filter the catalog's onboard ticket products based on the current location.

Regarding onboard ticket products, only the ones valid for the currently defined location are returned. Other products are not affected by this filtered.

◆ locationId

T_U16 locationId

Location identifier.

◆ lowLevelError

[ApexLowLevelError](#) lowLevelError

Details information on errors occurring on a lower level than the API-APEX.

See also

[ApexLowLevelError](#)

◆ loyaltyBinariesArray

[ApexBinary](#) loyaltyBinariesArray[[K_APEX_LOYALTY_RECORDS_MAX_SIZE](#)]

Array of loyalty binaries (sparse array).

◆ loyaltyDataNumber

T_U16 loyaltyDataNumber

Loyalty data number.

◆ loyaltyOperator

[ApexOperator](#) loyaltyOperator

Loyalty operator.

◆ loyaltyRecordsArray

ApexLoyaltyData* loyaltyRecordsArray

Array of loyalty data records (dynamically allocated).

◆ loyaltyRecordsCount

T_U16 loyaltyRecordsCount

Number of elements in the loyalty records array.

◆ machineCode [1/3]

T_U16 machineCode

Identifier of the machine running APEX.

◆ machineCode [2/3]

T_U16 machineCode

Identifier of the machine running APEX.

◆ machineCode [3/3]

T_U16 machineCode

Loading machine code.

◆ materializationType [1/2]

ApexMaterializationType materializationType

Product materialization type.

◆ materializationType [2/2]

ApexMaterializationType materializationType

Materialization type.

◆ matrixElementId

T_S8 matrixElementId[K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE]

Product matrix element identifier.

◆ matrixElementsArray

ApexMatrixElement* matrixElementsArray

Array of matrix elements detailing the zones and/or line where the product is valid (dynamically allocated).

◆ matrixElementsCount

T_U16 matrixElementsCount

Number of elements in the matrix elements array.

◆ maxAmount

T_S32 maxAmount

Maximum fine amount in cents.

◆ maxContractBinaries

T_U16 maxContractBinaries

Maximum number of contract binaries that can be written to the card for this card type.

◆ maxContracts

T_U16 maxContracts

Maximum number of contracts that can be written to the card for this card type.

◆ **maxDailyUsage**

T_U16 maxDailyUsage

Maximum number of daily usages of the contract.

◆ **maxLoyaltyBinaries**

T_U16 maxLoyaltyBinaries

Maximum number of loyalty binaries that can be written to the card for this card type.

◆ **mediaType**

T_VivaMediaType mediaType

Form factor of the portable object.

◆ **minAmount**

T_S32 minAmount

Minimum fine amount in cents.

◆ **name**

T_S8 name[K_APEX HOLDER_NAME_MAX_SIZE]

Holder name.

◆ **networkFullFilename** [1/2]

T_S8 networkFullFilename[K_APEX_FILE_PATH_MAX_SIZE]

Name and path of the network topology configuration file.

◆ **networkFullFilename** [2/2]

T_S8 networkFullFilename[K_APEX_FILE_PATH_MAX_SIZE]

Name and path of the network topology configuration file.

◆ **networkId** [1/4]

T_S8 networkId[K_APEX_NETWORK_ID_MAX_SIZE]

Network identifier.

◆ **networkId** [2/4]

T_S8 networkId[K_APEX_NETWORK_ID_MAX_SIZE]

Identifier of the network where the contract is valid.

◆ **networkId** [3/4]

T_S8 networkId[K_APEX_NETWORK_ID_MAX_SIZE]

Network where the event occurred.

◆ **networkId** [4/4]

T_S8 networkId[K_APEX_NETWORK_ID_MAX_SIZE]

Network where the event occurred.

◆ **numDailyFilePath** [1/2]

T_S8 numDailyFilePath[K_APEX_FILE_PATH_MAX_SIZE]

Path where the file to manage the operation count is located.

◆ **numDailyFilePath** [2/2]

T_S8 numDailyFilePath[K_APEX_FILE_PATH_MAX_SIZE]

Path where the file to manage the operation count is located.

◆ **numDaily.MaxValue** [1/2]

T_U16 numDaily.MaxValue

Maximum value for operations count.

◆ numDaily.MaxValue [2/2]

T_U16 numDaily.MaxValue

Maximum value for operations count.

◆ numDaily.MinValue [1/2]

T_U16 numDaily.MinValue

Minimum value for operations count.

◆ numDaily.MinValue [2/2]

T_U16 numDaily.MinValue

Minimum value for operations count.

◆ numValue

T_U32 numValue

Numeric value configuration for the parameter.

◆ numValue64

T_U64 numValue64

64-bit numeric value configuration for the parameter.

The highPart represents the 32 most significant bits and the lowPart the 32 least significant bits.

◆ offenderAddress

T_S8 offenderAddress[K_APEX_OFFENDER_ADDRESS_MAX_SIZE]

Address of the offender.

◆ **offenderBirthDate**

T_UtilDate offenderBirthDate

Birth date of the offender.

◆ **offenderDocumentType**

ApexDocumentType offenderDocumentType

Identification document type of the offender.

◆ **offenderIdentityNumber**

T_S8 offenderIdentityNumber[K_APEX_IDENTITY_NUMBER_MAX_SIZE]

Identity number of the offender.

◆ **offenderName**

T_S8 offenderName[K_APEX_OFFENDER_NAME_MAX_SIZE]

Name of the offender.

◆ **offenderPostalCode**

T_S8 offenderPostalCode[K_APEX_OFFENDER_POSTAL_CODE_MAX_SIZE]

Postal code of the offender.

◆ **offenderVatNumber**

T_S8 offenderVatNumber[K_APEX_VAT_NUMBER_MAX_SIZE]

VAT number of the offender.

◆ onlineCheckFlag

T_U8 onlineCheckFlag

Indicates whether online checks are mandatory for this greenlist element (boolean).

Overwrites the current ApexGreenlistBehavior if the current ApexGreenlistBehavior is set to APEX_GREENLIST_BEHAVIOR_LOAD (ignored otherwise).

◆ operationsAllowed

T_U8 operationsAllowed[APEX_OPERATION_TYPE_MAX_VALUE]

Indicates which operations are allowed for this product.

Each element in the array represents a product operation, and its index is represented by the product operation value in the enumerated.

If the array element has a value of one (1), it indicates that the operation is allowed, otherwise it is prohibited.

Byte Array Index	[0]	[1]	[2]	[3]	[...]
Operation	Read	Sale	Load	Reload	[...]

See also

[ApexProductOperationType](#)

◆ operatordataArray

[ApexLoyaltyOperatorData](#)* operatordataArray

Operator specific loyalty data (dynamically allocated).

◆ operatorDataCount

T_U16 operatorDataCount

Number of elements in the operator data array.

◆ operatorId [1/4]

T_S8 operatorId[K_APEX_OPERATOR_ID_MAX_SIZE]

Operator identifier.

◆ **operatorId** [2/4]

T_S8 operatorId[K_APEX_OPERATOR_ID_MAX_SIZE]

Operator identifier. This ID must match one defined in the Technical Parameters configuration file.

◆ **operatorId** [3/4]

T_S8 operatorId[K_APEX_OPERATOR_ID_MAX_SIZE]

Operator identifier. This ID must match one defined in the Technical Parameters configuration file.

◆ **operatorId** [4/4]

T_S8 operatorId[K_APEX_OPERATOR_ID_MAX_SIZE]

Operator identifier. This ID must match one defined in the Technical Parameters configuration file.

◆ **operatorName** [1/2]

T_S8 operatorName[K_APEX_OPERATOR_NAME_MAX_SIZE]

Operator name.

◆ **operatorName** [2/2]

T_S8 operatorName[K_APEX_OPERATOR_NAME_MAX_SIZE]

Operator name.

◆ **operatorsArray**

ApexOperator* operatorsArray

Array of operators where the spatial validity is applied (dynamically allocated).

◆ **operatorsCount**

T_U16 operatorsCount

Number of elements in the operators array.

◆ **operatorShortName** [1/2]

T_S8 operatorShortName[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE]

Operator short name.

◆ **operatorShortName** [2/2]

T_S8 operatorShortName[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE]

Operator short name.

◆ **originZone**

ApexZone originZone

Origin zone.

Valid on all zones if empty.

◆ **originZoneId**

T_S8 originZoneId[K_APEX_ZONE_ID_MAX_SIZE]

Origin zone identifier.

This field is only available when the event is of type Pre-selection.

◆ **originZoneName**

T_S8 originZoneName[K_APEX_ZONE_NAME_MAX_SIZE]

Origin zone name.

◆ **originZonesArray**

ApexZone* originZonesArray

Array containing all available origin zones.

◆ originZonesCount

T_U16 originZonesCount

Number of elements of the originZonesArray.

◆ originZoneSelectedIndex

T_U16 originZoneSelectedIndex

Selected origin zone index.

◆ parameterArray

ApexProductParameter* parameterArray

Parameters available for configuration.

◆ parameterCount

T_U8 parameterCount

Number of configuration parameters in the parameter array.

◆ parkBinary

ApexBinary parkBinary

Park binary data.

◆ parkData

ApexParkData parkData

Card parking data.

◆ pattern

ApexPattern pattern

Pattern.

Valid on all patterns if empty.

◆ **patternId** [1/4]

T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE]

Pattern identifier.

◆ **patternId** [2/4]

T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE]

Pattern identifier.

◆ **patternId** [3/4]

T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE]

Line identifier.

◆ **patternId** [4/4]

T_S8 patternId[K_APEX_LINE_ID_MAX_SIZE]

Pattern filter.

Ignored if empty or if lineId is empty.

◆ **patternInfoArray**

ApexPatternInfo* patternInfoArray

Array of line patterns.

◆ **patternInfoCount**

T_U16 patternInfoCount

Number of elements in the pattern array.

◆ **patternName** [1/3]

T_S8 patternName[K_APEX_PATTERN_NAME_MAX_SIZE]

Pattern name.

◆ **patternName** [2/3]

T_S8 patternName[K_APEX_PATTERN_NAME_MAX_SIZE]

Line name.

◆ **patternName** [3/3]

T_S8 patternName[K_APEX_PATTERN_NAME_MAX_SIZE]

Pattern name.

◆ **paymentMethod**

ApexPaymentMethod paymentMethod

Payment method used during a product sale.

◆ **periodRemainingTrips**

T_U8 periodRemainingTrips

Number of remaining trips.

◆ **periodStart**

T_U8 periodStart

Start of the period for limited trips.

◆ **personalizationId**

T_S8 personalizationId[K_APEX_PERSONALIZATION_ID_MAX_SIZE]

Personalization identifier (future use).

◆ physicalSupport

ApexPhysicalSupport physicalSupport

Details of the physical support sale.

◆ preSelectionODType

ApexPreSelectionODType preSelectionODType

OD pre-selection type.

Note

This value is defined per operator, meaning that for the same product, this flag may have different values in different operators.

◆ preSelectionType

ApexPreSelectionType preSelectionType

Contract pre-selection type.

◆ preValidationStatus

ApexPreValidationStatus preValidationStatus

Contract pre-validation status.

Indicates whether a contract is potentially valid, taking in consideration the contract's temporal validity and number of units.

Does not replace the need to perform validation and control operations for VALID contracts.

◆ price [1/6]

T_S32 price

Price in cents of the sales package.

◆ price [2/6]

T_S32 price

Price in cents of the sales package.

◆ price [3/6]

T_S32 price

Price in cents of the physical support.

◆ price [4/6]

T_S32 price

Total amount to be requested to the customer in cents.

This includes the amount defined by physicalSupport.Price if hasPhysicalSupport is set to TRUE.

◆ price [5/6]

T_S32 price

Value, in cents, to be returned to the customer.

◆ price [6/6]

T_S32 price

Ticket price.

◆ priceAmount

T_U16 priceAmount

Amount of the event.

◆ procedure

T_S8 procedure[K_APEX_INFRACTION_PROCEDURE_MAX_SIZE]

Pocedure to follow in the case of the infraction.

◆ productCategoriesArray

ApexProductCategory* productCategoriesArray

Array of the product's categories.

◆ productCategoriesCount

T_U16 productCategoriesCount

Number of elements in the product category array.

◆ productExpirationDate

T_UtilDateTime productExpirationDate

Product expiration date (present if productHasExpirationDate is set).

◆ productHasExpirationDate

T_U8 productHasExpirationDate

Indicates if the product has an expiration date.

◆ productId [1/8]

T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE]

Product identifier.

◆ productId [2/8]

T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE]

Identifier of the product.

◆ productId [3/8]

T_S8 productId[[K_APEX_PRODUCT_ID_MAX_SIZE](#)]

Physical support product identifier.

◆ **productId** [4/8]

T_S8 productId[[K_APEX_PRODUCT_ID_MAX_SIZE](#)]

Product id. This identifier must correspond to one given by the catalog.

Used to configure new products to be loaded into the card or existing products to be reloaded.

◆ **productId** [5/8]

T_S8 productId[[K_APEX_PRODUCT_ID_MAX_SIZE](#)]

Product identifier.

◆ **productId** [6/8]

T_S8 productId[[K_APEX_PRODUCT_ID_MAX_SIZE](#)]

Product identifier.

◆ **productId** [7/8]

T_S8 productId[[K_APEX_PRODUCT_ID_MAX_SIZE](#)]

Product identifier.

◆ **productId** [8/8]

T_S8 productId[[K_APEX_PRODUCT_ID_MAX_SIZE](#)]

Product identifier.

◆ **productLongId** [1/4]

T_S8 productLongId[[K_APEX_PRODUCT_ID_MAX_SIZE](#)]

Product to which this greylist element is applied.

◆ **productLongId** [2/4]

T_S8 productLongId[K_APEX_PRODUCT_ID_MAX_SIZE]

Product to which this whitelist element is applied.

◆ **productLongId** [3/4]

T_S8 productLongId[K_APEX_PRODUCT_ID_MAX_SIZE]

Product to which this whitelist element is applied.

◆ **productLongId** [4/4]

T_S8 productLongId[K_APEX_PRODUCT_ID_MAX_SIZE]

Product to which this greenlist element is applied.

◆ **productName** [1/7]

T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE]

Product name.

◆ **productName** [2/7]

T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE]

Name of the product.

◆ **productName** [3/7]

T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE]

Physical support name.

◆ **productName** [4/7]

T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE]

Product name.

◆ **productName** [5/7]

T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE]

Product name.

◆ **productName** [6/7]

T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE]

Product name.

◆ **productName** [7/7]

T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE]

Product name.

◆ **profileCombinationsArray**

ApexProfileCombination* profileCombinationsArray

Array of the profile combinations required by the product.

Note

The card must have at least one of the profile combinations to load the product.

◆ **profileCombinationsCount**

T_U16 profileCombinationsCount

Number of elements in the profile combination array.

◆ **profileId** [1/2]

T_S8 profileId[K_APEX_PROFILE_ID_MAX_SIZE]

Profile identifier.

◆ **profileId** [2/2]

T_S8 profileId[K_APEX_PROFILE_ID_MAX_SIZE]

Profile identifier.

◆ **profileName** [1/2]

T_S8 profileName[K_APEX_PROFILE_NAME_MAX_SIZE]

Profile name.

This field is only used in read and control operations. It is defined in the Commercial Offer configuration file.

◆ **profileName** [2/2]

T_S8 profileName[K_APEX_PROFILE_NAME_MAX_SIZE]

Profile name.

This field is only used in read and control operations. It is defined in the Commercial Offer configuration file.

◆ **profileNumber**

T_U16 profileNumber

Profile number.

◆ **profilesArray** [1/4]

ApexCardProfile* profilesArray

Array of holder profiles (dynamically allocated).

Note: If **ApexEnvironment** is being passed as an input to **ApexIssue()** it is the responsibility of the user to allocate and free this array of profiles.

◆ **profilesArray** [2/4]

ApexProfile* profilesArray

Array of profiles.

◆ **profilesArray** [3/4]

ApexCardProfile profilesArray[K_APEX_PROFILES_MAX_SIZE]

Array of profiles to be used in the validation.

◆ **profilesArray** [4/4]

ApexCardProfile profilesArray[K_APEX_PROFILES_MAX_SIZE]

Array of profiles used in the validation (present if profilesCount is bigger than 0).

◆ **profilesCount** [1/4]

T_U16 profilesCount

Number of holder profile data entries. (0..7).

◆ **profilesCount** [2/4]

T_U16 profilesCount

Number of elements in the profiles array.

◆ **profilesCount** [3/4]

T_U16 profilesCount

Number of elements in the profiles array.

◆ **profilesCount** [4/4]

T_U16 profilesCount

Number of elements in the profiles array.

◆ **profilesUsedMask** [1/2]

T_U8 profilesUsedMask

Mask with the profiles used in the validation.

◆ **profilesUsedMask** [2/2]

T_U8 profilesUsedMask

Mask with the profiles used in the validation.

◆ **profileValidationFlag**

T_U8 profileValidationFlag

If TRUE (1), it indicates that the validation will be executed using a whitelist profile. Otherwise, it indicates that the validation will be performed by a contract.

◆ **promptAmount**

T_S32 promptAmount

Fine amount in the case of immediate payment.

◆ **readerAddress** [1/2]

T_S8 readerAddress[K_APEX_READER_ADDRESS_MAX_SIZE]

Card reader address.

Note

The reader address is mandatory when the coupler type is **not** set to K_CSC_TYPE_CNA. E.g. "COM7:115200".

◆ **readerAddress** [2/2]

T_S8 readerAddress[K_APEX_READER_ADDRESS_MAX_SIZE]

SAM reader address.

Note

The reader address is mandatory when the coupler type is **not** set to K_CSC_TYPE_CNA. E.g. "COM7:115200".

◆ **recordsArray**

ApexLoyaltyOperatorRecord* recordsArray

Array of operator records (dynamically allocated).

◆ **recordsCount**

T_U16 recordsCount

Number of elements in the records array (1..4).

◆ **rehabilitationDate**

T_UtilDate rehabilitationDate

Application rehabilitation date.

◆ **remainingUnits**

T_U32 remainingUnits

Number of units remaining (present if unitType is not NONE).

◆ **requiredContractNumber**

T_U16 requiredContractNumber

Number of the base contract that this contract needs in order to be valid.

◆ **restrictions**

ApexContractRestrictions restrictions

Contract restrictions.

◆ **restrictTime**

T_VivaContractRestrictTime restrictTime

Time period restrictions.

◆ **rightExtensionType** [1/2]

T_VivaContractRightExtensionType rightExtensionType

Product right extension type.

◆ **rightExtensionType** [2/2]

T_VivaContractRightExtensionType rightExtensionType

Right extension type.

◆ **saleCount**

T_U32 saleCount

Contract loading equipment daily sale number.

◆ **saleDate** [1/4]

T_UtilDate saleDate

Contract sale date.

◆ **saleDate** [2/4]

T_UtilDate saleDate

Contract sale date.

◆ **saleDate** [3/4]

T_UtilDate saleDate

Contract sale date.

◆ **saleDate** [4/4]

T_UtilDateTime saleDate

Sale date.

◆ **saleOperator**

ApexOperator saleOperator

Contract sale/load operator.

◆ **saleSamMachineId**

T_U32 saleSamMachineId

Contract loading SAM (machine code) identifier.

◆ **salesPackageChoiceArray**

ApexProductSalesPackageChoice* salesPackageChoiceArray

Available sales packages for configuration.

◆ **salesPackageChoiceCount**

T_U16 salesPackageChoiceCount

Number of elements in the sales package choice array.

◆ **salesPackageld** [1/4]

T_S8 salesPackageld[K_APEX_SALES_PACKAGE_ID_MAX_SIZE]

Identifier of the sales package.

◆ **salesPackageld** [2/4]

T_S8 salesPackageld[K_APEX_SALES_PACKAGE_ID_MAX_SIZE]

Identifier of the sales package.

◆ **salesPackageld** [3/4]

T_S8 salesPackageld[K_APEX_SALES_PACKAGE_ID_MAX_SIZE]

Identifier of the sales package that will be used in the physical support sale.

◆ **salesPackageld** [4/4]

T_S8 salesPackageld[K_APEX_SALES_PACKAGE_ID_MAX_SIZE]

Product sales package identifier.

◆ **salesPackagesArray**

ApexProductSalesPackage* salesPackagesArray

Array of the product's sales packages.

◆ **salesPackagesCount**

T_U16 salesPackagesCount

Number of elements in the sales packages array.

◆ **samAttr**

T_U8 samAttr[K_ATR_MAX_LENGTH]

ATR returned by the card security module(SAM).

Note

This parameter is only required for the K_CSC_TYPE_CNA and K_CSC_TYPE_EXTERNAL coupler types.

◆ **samAttrLen**

T_U16 samAttrLen

ATR length of the SAM.

Note

This parameter is only required for the K_CSC_TYPE_CNA and K_CSC_TYPE_EXTERNAL coupler types.

◆ **samBlacklistItemId**

T_S8 samBlacklistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]

Identifier of the blacklist element.

◆ **samInBlacklistFlag**

T_U8 samInBlacklistFlag

Indicates whether or not the SAM that loaded the contract is in the blacklist.

The SAM is present in the blacklist if this value is set to TRUE (1) and not present if set to FALSE (0).

◆ **samSerialNumber**

T_U64 samSerialNumber

SAM serial number.

◆ **samTypId [1/2]**

T_S8 samTypId[K_APEX_SAM_TYPE_ID_MAX_SIZE]

Identifier of the SAM type. This ID must match one defined in the technical parameters file.

◆ **samTypId [2/2]**

T_S8 samTypId[K_APEX_SAM_TYPE_ID_MAX_SIZE]

SAM type identifier (configured in the technical parameters file).

◆ searchMode

T_SearchMode searchMode

Card and ticket search mode.

◆ securityData

T_S8 securityData[K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE]

Paper ticket security content. This content is used as input for the paper ticket control operation.

See also

[ApexPaperControl](#)

◆ slotNumber

T_U8 slotNumber

SAM slot number.

◆ spatialValiditiesArray [1/4]

[ApexSpatialValidity*](#) spatialValiditiesArray

Array of spatial validity records (dynamically allocated).

◆ spatialValiditiesArray [2/4]

[ApexSpatialValidityData*](#) spatialValiditiesArray

Array of spatial validity associations.

Note

This array has a fixed size of K_APEX_SPATIAL_VALIDITY_MAX_SIZE elements.

◆ spatialValiditiesArray [3/4]

[ApexSpatialValidityData*](#) spatialValiditiesArray

Array of spatial validity associations.

Note

This array has a fixed size of K_APEX_SPATIAL_VALIDITY_MAX_SIZE elements.

◆ spatialValiditiesArray [4/4]

ApexSpatialValidityData* spatialValiditiesArray

Array of spatial validity associations.

Note

This array has a fixed size of K_APEX_SPATIAL_VALIDITY_MAX_SIZE elements.

◆ spatialValiditiesCount [1/4]

T_U16 spatialValiditiesCount

Number of elements in the spatial validities array.

◆ spatialValiditiesCount [2/4]

T_U32 spatialValiditiesCount

Number of entries in the spatialValiditiesArray.

◆ spatialValiditiesCount [3/4]

T_U32 spatialValiditiesCount

Number of entries in the spatialValiditiesArray.

◆ spatialValiditiesCount [4/4]

T_U32 spatialValiditiesCount

Number of entries in the spatialValiditiesArray.

◆ spatialValidityChoiceArray

ApexProductSpatialValidityChoice* spatialValidityChoiceArray

Available spatial validity elements for configuration.

◆ **spatialValidityChoiceCount**

T_U16 spatialValidityChoiceCount

Number of elements in the spatial validity choice array.

◆ **spatialValidityId [1/2]**

T_S8 spatialValidityId[K_APEX_GENERIC_ID_MAX_SIZE]

Identifier of the spatial validity.

◆ **spatialValidityId [2/2]**

T_S8 spatialValidityId[K_APEX_SPATIAL_VALIDITY_ID_MAX_SIZE]

Associated spatial validity identifier.

◆ **startDate [1/5]**

T_UtilDate startDate

Profile start date.

◆ **startDate [2/5]**

T_UtilDate startDate

Start date of the loyalty data.

◆ **startDate [3/5]**

T_UtilDateTime startDate

Start date of the blacklist element effective period.

◆ **startDate [4/5]**

T_UtilDateTime startDate

Start date of the whitelist element effective period.

◆ **startDate** [5/5]

T_UtilDateTime startDate

Start date of the whitelist element effective period.

◆ **status**

[ApexConfigureProductStatus](#) status

Contains the status of the current product configuration.

◆ **status1**

T_U32 status1

Represents a status or error depending on the value of errorType.

See also

[ApexLowLevelErrorType](#)

◆ **status2**

T_U32 status2

Represents a status or error depending on the value of errorType.

See also

[ApexLowLevelErrorType](#)

◆ **stop**

[ApexStop](#) stop

Stop.

Valid on all stops if empty.

◆ **stopId** [1/3]

T_S8 stopId[K_APEX_STOP_ID_MAX_SIZE]

Stop identifier.

◆ stopId [2/3]

T_S8 stopId[K_APEX_STOP_ID_MAX_SIZE]

Stop identifier.

◆ stopId [3/3]

T_S8 stopId[K_APEX_STOP_ID_MAX_SIZE]

Stop identifier.

◆ stopInfoArray

ApexStopInfo* stopInfoArray

Array of pattern stops.

◆ stopInfoCount

T_U16 stopInfoCount

Number of elements in the stops array.

◆ stopName [1/3]

T_S8 stopName[K_APEX_STOP_NAME_MAX_SIZE]

Stop name.

◆ stopName [2/3]

T_S8 stopName[K_APEX_STOP_NAME_MAX_SIZE]

Stop name.

◆ stopName [3/3]

T_S8 stopName[K_APEX_STOP_NAME_MAX_SIZE]

Stop name.

◆ taxPercentage [1/4]

T_S32 taxPercentage

Value in percentage of the applied tax rate.

◆ taxPercentage [2/4]

T_S32 taxPercentage

Value in percentage of the applied tax rate.

◆ taxPercentage [3/4]

T_S32 taxPercentage

Value in percentage of the applied tax rate.

◆ taxPercentage [4/4]

T_S32 taxPercentage

Value in percentage of the applied tax rate.

◆ taxValue [1/3]

T_S32 taxValue

Value in cents of the tax.

◆ taxValue [2/3]

T_S32 taxValue

Value in cents of the tax.

◆ **taxValue** [3/3]

T_S32 taxValue

Value in cents of the tax.

◆ **techParamsFullFilename** [1/2]

T_S8 techParamsFullFilename[K_APEX_FILE_PATH_MAX_SIZE]

Name and path of the technical parameters configuration file.

◆ **techParamsFullFilename** [2/2]

T_S8 techParamsFullFilename[K_APEX_FILE_PATH_MAX_SIZE]

Name and path of the technical parameters configuration file.

◆ **temporalUnits**

T_U32 temporalUnits

Number of temporal validity units that will be removed.

◆ **temporalUnitsType**

ApexContractDurationType temporalUnitsType

Type of the temporal validity units that will be removed.

◆ **temporalValidity**

ApexContractTemporalValidity temporalValidity

Temporal validity.

◆ **textValue**

T_S8 **textValue[K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_SIZE]**

Text value configuration for the parameter.

◆ **ticketNumber**

T_S8 **ticketNumber[K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE]**

Ticket number.

This number is generated with the use of the SAM number and counter, making it always unique.

◆ **timeBetweenPassengers**

T_U16 **timeBetweenPassengers**

Time (in seconds) allowed between passengers during a validation for a group contract.

This represents the time each of the members of the group have to validate the ticket for a single trip.

◆ **transactionId**

T_S8 **transactionId[K_APEX_TRANSACTION_ID_MAX_SIZE]**

Control transaction unique identifier.

◆ **tripClass**

ApexTripClass **tripClass**

Trip class.

◆ **tripDuration [1/2]**

T_U16 **tripDuration**

Duration value of a single trip.

◆ **tripDuration [2/2]**

ApexTripDuration **tripDuration**

Trip duration according with the operator's exploration period.

◆ **tripDurationType**

ApexTripDurationType tripDurationType

Duration type of a single trip. Gives meaning to the tripDuration field.

◆ **type**

ApexProductParamType type

Identifier of the parameter.

◆ **units** [1/2]

T_U32 units

Number of units in the counter that will be transferred.

◆ **units** [2/2]

T_U32 units

Number of units in the counter that will be removed.

◆ **unitsNumber** [1/2]

T_U16 unitsNumber

Number of units.

◆ **unitsNumber** [2/2]

T_U16 unitsNumber

Number of units.

◆ **unitsToDebit**

T_U32 unitsToDebit

Number of units to be debited.

◆ **unitType [1/4]**

ApexUnitType unitType

Defines the type of contract units.

◆ **unitType [2/4]**

ApexUnitType unitType

Type of units considered.

◆ **unitType [3/4]**

ApexUnitType unitType

Type of units represented by the counter.

◆ **unitType [4/4]**

ApexUnitType unitType

Type of units represented by the counter.

◆ **usageData**

T_U8 usageData

Usage data.

◆ **usedProfilesCount**

T_U16 usedProfilesCount

Number of entries with data in the usedProfilesIdArray.

◆ usedProfilesIdArray

T_S8 usedProfilesIdArray[K_APEX_PROFILES_MAX_SIZE][K_APEX_PROFILE_ID_MAX_SIZE]

Array of profile identifiers.

◆ utilization

T_VivaContractUtilization utilization

Restricts the access of the contract.

◆ utilizationMode [1/2]

ApexUtilizationMode utilizationMode

The utilization mode influences the type of validations performed.

◆ utilizationMode [2/2]

ApexUtilizationMode utilizationMode

The utilization mode influences the type of validations performed.

◆ validationStatus

ApexValidationStatus validationStatus

Validation result status.

If the validation status corresponds to an invalid validation the remaining fields won't be set. If the validation status corresponds to a valid (or interrupted) validation the remaining fields will be set according to the product being used to perform the validation.

◆ validityEndDate [1/2]

T_UtilDate validityEndDate

Last valid day of the contract. Empty if not defined or not used.

◆ **validityEndDate** [2/2]

T_UtilDate validityEndDate

Last valid day of the contract. Empty if not defined or not used.

◆ **validityStartDate** [1/2]

T_UtilDate validityStartDate

Contract validity start date. Empty if not defined or not used.

◆ **validityStartDate** [2/2]

T_UtilDate validityStartDate

Contract validity start date. Empty if not defined or not used.

◆ **validityStartTime**

T_UtilDateTime validityStartTime

Contract validity start date and time.

◆ **value**

T_U32 value

Value of the loyalty counter.

◆ **vatNumber** [1/2]

T_U32 vatNumber

Holder VAT number.

◆ **vatNumber** [2/2]

T_S8 vatNumber[K_APEX_VAT_NUMBER_MAX_SIZE]

VAT number.

◆ **vehicleId**

T_U16 vehicleId

Vehicle identifier.

◆ **via**

ApexZone via

Via zone.

Valid on all zones if empty.

◆ **viaZoneName**

T_S8 viaZoneName[K_APEX_ZONE_NAME_MAX_SIZE]

Via zone name.

◆ **whitelistItemId** [1/2]

T_S8 whitelistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]

Identifier of the whitelist element.

◆ **whitelistItemId** [2/2]

T_S8 whitelistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]

Identifier of the whitelist element.

◆ **whitelistStatus**

ApexControlWhitelistStatus whitelistStatus

Indicates the status of the control operation over the data present in the whitelist.

◆ witnessDocumentType

ApexDocumentType witnessDocumentType

Identification document type of the witness.

◆ witnessIdentityNumber

T_S8 witnessIdentityNumber[K_APEX_IDENTITY_NUMBER_MAX_SIZE]

Identity number of the witness.

◆ zoneChoiceArray

ApexProductZoneChoice* zoneChoiceArray

Available zones for configuration.

◆ zoneChoiceCount

T_U16 zoneChoiceCount

Number of elements in the zone choice array.

◆ zoneChoiceNumberOfSelections

T_U16 zoneChoiceNumberOfSelections

Number of elements in the zone choice array that must be selected.

◆ zoneld [1/2]

T_S8 zoneld[K_APEX_ZONE_ID_MAX_SIZE]

Zone identifier.

◆ zoneld [2/2]

T_S8 zoneld[K_APEX_ZONE_ID_MAX_SIZE]

Identifier of the zone.

◆ **zonIdArray**

T_S8 zonIdArray[K_APEX_MAX_AVAILABLE_ZONES_COUNT][K_APEX_ZONE_ID_MAX_SIZE]

Array of zone identifiers.

◆ **zoneName [1/2]**

T_S8 zoneName[K_APEX_ZONE_NAME_MAX_SIZE]

Zone name.

◆ **zoneName [2/2]**

T_S8 zoneName[K_APEX_ZONE_NAME_MAX_SIZE]

Zone name.

◆ **zonesCount**

T_U32 zonesCount

Number of entries with data in the zonesArray.

◆ **zonesNumberFromStart**

T_U8 zonesNumberFromStart

Number of valid zones counting from the zone where the product was validated.

Data Structures

Here are the data structures with brief descriptions:

C ApexBinary	Generic structure to hold binary data
C ApexBlacklistCardElement	Information of the Card Blacklist element
C ApexBlacklistSamElement	Information of the SAM Blacklist element
C ApexCancelParameters	Structure containing the required parameters to cancel part or the totality of a loaded ticket
C ApexCardBinaries	Structure containing all binary data read from a card
C ApexCardData	Structure containing the card data
C ApexCardDataExtra	Structure containing the loyalty records and park data read from a card
C ApexCardDetectedInfo	Structure containing all data related to the detected card
C ApexCardInfo	Card information
C ApexCardProfile	Data structure containing the data related to a card profile
C ApexCardReaderConfig	Data structure containing the required info to

	initialize a card reader
C ApexCardSamAssociation	Structure identifying which card and SAM readers are to be associated and how this association should be interpreted
C ApexCardTypeId	Data structure containing a card type identifier
C ApexCatalog	Products catalog
C ApexCatalogProduct	Contains the sale details of a product
C ApexCatalogTransferParameters	Structure containing the required parameters to perform a contract transferral from a configured catalog product
C ApexCheckConfigFilesInputParameters	ApexCheckConfigFiles() input parameters
C ApexConfigurePreSelectionParameters	Pre-selection configuration parameters
C ApexConfigureProductParameters	Data structure containing all the input data required by the function ApexConfigureProduct()
C ApexConfirmCancelInfo	Structure containing information about the cancellation operation in progress
C ApexConfirmTransferInfo	Structure containing information about the transferral operation in progress
C ApexConfirmValidationInfo	Structure containing information about the

		validation operation in progress
C ApexContract		Apex contract data structure based on Viva v2 data model structure
C ApexContractCharacteristics		Structure that describes a contract's characteristics
C ApexContractRestrictions		Structure that describes a contract's restrictions
C ApexContractTemporalValidity		Structure that contains the data related to a contract's temporal validity
C ApexControlFine		Control Fine
C ApexControlOutputData		Structure containing all data data related to the control operation and its result
C ApexControlServiceLocation		Control service location context
C ApexDamagedCardInfo		Damaged card information
C ApexEnvironment		Card environment data structure
C ApexEvent		Apex event data structure
C ApexEventContractUsage		Structure containing the information on the usage of a contract
C ApexFileHeaderInfo		Describes the common data of the configuration files' header
C ApexFine		Fine
C ApexFineAttribute		Fine attribute
C ApexFineAttributes		Fine attributes array
C ApexFines		Fines array
		ApexGetCatalog() input

C ApexGetCatalogParameters	parameters
C ApexGetFinesInputParameters	ApexGetFines() input parameters
C ApexGetInfractionsInputParameters	ApexGetInfractions() input parameters
C ApexGetLinesInputParameters	ApexGetLines() input parameters
C ApexGreenlistElement	Information of the Greenlist element
C ApexGreenlistLoadParameters	Greenlist load input parameters
C ApexGreylistElement	Information of the Greylist element
C ApexHolderId	Apex holder identification data structure
C ApexInfraction	Infraction
C ApexInfractionAttribute	Infraction attribute
C ApexInfractionAttributes	Infraction attributes array
C ApexInfractions	Infractions array
C ApexInitParameters	Apex initialization parameters
C ApexIssueData	Structure containing the required data for a card issuing
C ApexLastError	Contains all available information on the last error status
C ApexLine	Structure that describes a line
C ApexLineInfo	Information of a line
C ApexLinesInfo	Lines Info array
C ApexLogConfig	Data structure used to configure the logger
C ApexLowLevelError	Details information on errors occurring on a

		lower level than the API-APEX
C ApexLoyaltyData		Loyalty data structure
C ApexLoyaltyOperatorData		Operator specific loyalty data structure
C ApexLoyaltyOperatorRecord		Loyalty data record structure
C ApexMatrixElement		Matrix selection element
C ApexOperator		Structure that describes an operator
C ApexOperatorConfig		Apex operator configuration parameters
C ApexPaperSaleAckParameters		Input parameters of the ApexPaperSaleAck() function
C ApexPaperTicketData		Data to be printed on the onboard ticket
C ApexParkData		Apex Parking Data structure based on Viva v2 data model structure
C ApexPattern		Structure that describes a run
C ApexPatternInfo		Information of a pattern
C ApexPaymentInfo		Payment information
C ApexPerformanceConfig		Performance configuration
C ApexPhysicalSupport		Details of the physical card required to complete the transport product sale
C ApexPreSelectionConfiguration		Pre-selection configuration data
C ApexPreSelectionParameters		Pre-selection confirmation parameters
C ApexProductCategory		Product Category
C ApexProductConfiguration		Represents a product configuration

C ApexProductParameter	Product parameter to be configured
C ApexProductSalesPackage	Sales package of a product
C ApexProductSalesPackageChoice	Represents a choice available for a sales package selection
C ApexProductSpatialValidityChoice	Represents a choice available for a spatial validity selection
C ApexProductZoneChoice	Represents a choice available for a zone selection
C ApexProfile	Data structure containing the data that defines a profile
C ApexProfileCombination	Represents a profile combination
C ApexReadCardInputParameters	Structure containing all parameters required to run a card read operation
C ApexReadCardOutputData	Structure containing all data read from a card
C ApexReadTransferParameters	Structure containing the required parameters to perform a contract transferral from a card
C ApexSamReaderConfig	Data structure containing the required info to initialize a SAM reader
C ApexServiceLocation	Service location context
C ApexSpatialValidity	Spatial validity data
C ApexSpatialValidityData	Spatial validity data
C ApexStop	Structure that describes a stop
C ApexStopInfo	Information of a stop

⌚ ApexTransferParameters	Structure containing the input parameters for each of the transfer modes
⌚ ApexTripDuration	Structure that indicates the trip duration
⌚ ApexValidationInfo	Structure that indicates the remaining and decremented units of the card and the name of the contract(s) validated
⌚ ApexVersion	Describes the API-APEX version data structure
⌚ ApexWhitelistCardElement	Information of the Whitelist (card) element
⌚ ApexWhitelistProfileElement	Information of the Whitelist (Profile) element
⌚ ApexZone	Structure that describes a zone

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Data Fields

ApexBinary Struct Reference

Generic structure to hold binary data. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_U16 **binaryDataSize**

Size of binaryData. [More...](#)

T_U8 **binaryData [K_APEX_BINARY_MAX_SIZE]**

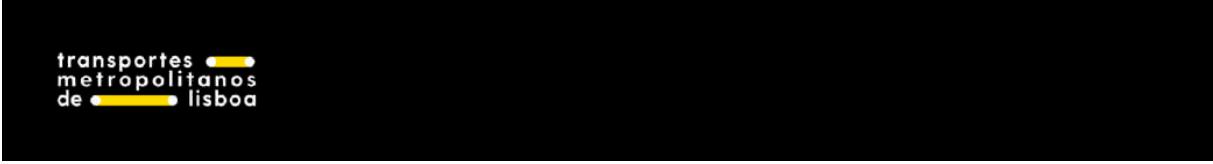
Array containing the binary data. [More...](#)

Detailed Description

Generic structure to hold binary data.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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de [REDACTED] lisboa



Data Fields

ApexBlacklistCardElement Struct Reference

Information of the Card Blacklist element. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **cardBlacklistItemId**
[[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE](#)]
Identifier of the blacklist element. [More...](#)

T_S8 **cardTypeId** [[K_APEX_CARD_TYPE_ID_MAX_SIZE](#)]
Card type identifier. [More...](#)

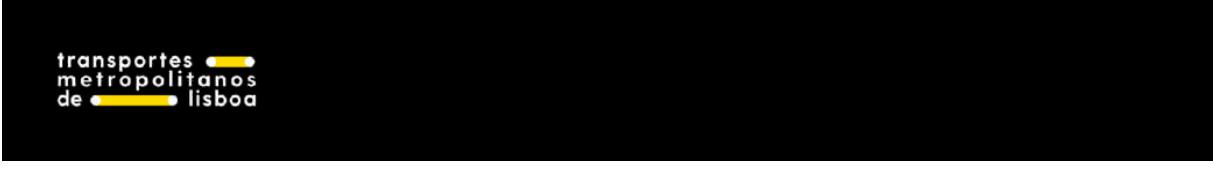
T_U64 **cardSerialNumber**
Card serial number. [More...](#)

Detailed Description

Information of the Card Blacklist element.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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ApexBlacklistSamElement Struct Reference

Information of the SAM Blacklist element. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **samBlacklistItemId**
[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]
Identifier of the blacklist element. [More...](#)

T_S8 **samTypeld**
[K_APEX_SAM_TYPE_ID_MAX_SIZE]
SAM type identifier (configured in the technical parameters file). [More...](#)

T_U64 **samSerialNumber**
SAM serial number. [More...](#)

T_U8 **hasStartDate**
Indicates if the "startDate" field was set. [More...](#)

T_UtilDateTime **startDate**
Start date of the blacklist element effective period. [More...](#)

T_U8 hasEndDate

Indicates if the "endDate" field was set. [More...](#)

T_UtilDateTime endDate

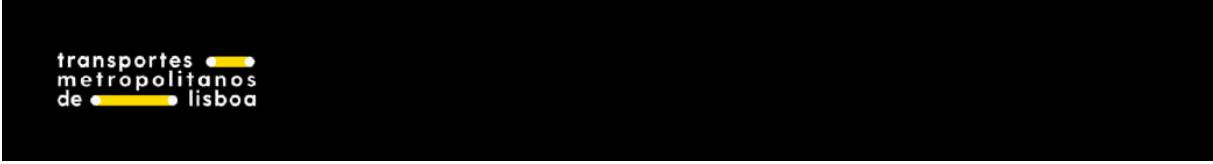
End date of the blacklist element effective period (inclusive). [More...](#)

Detailed Description

Information of the SAM Blacklist element.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



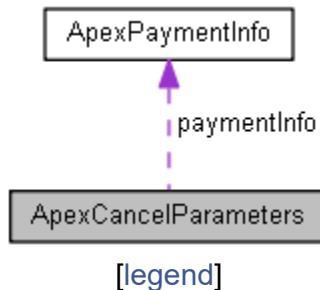
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de [REDACTED] lisboa

ApexCancelParameters Struct Reference

Structure containing the required parameters to cancel part or the totality of a loaded ticket. [More...](#)

```
#include <apex.h>
```

Collaboration diagram for ApexCancelParameters:



Data Fields

T_U8 **contractNumber**

Contract number (starting at 1). [More...](#)

T_U32 **productQuantity**

Number of times that the equivalent of a product sale is going to be subtracted to the contract. [More...](#)

T_U32 **unitsQuantity**

Value that is going to be subtracted from the counter. [More...](#)

T_S32	price Value, in cents, to be returned to the customer. More...
T_S8	salesPackageID [K_APEX_SALES_PACKAGE_ID_MAX_SIZE] Identifier of the sales package. More...
T_U8	dailyUsageRateFlag Defines whether the daily usage rate should be considered during the cancel operation. More...
T_U16	usageDays Number of days to which the daily usage rate will be applied. More...

Detailed Description

Structure containing the required parameters to cancel part or the totality of a loaded ticket.

Field Documentation

- ◆ **contractNumber**

T_U8 contractNumber

Contract number (starting at 1).

- ◆ **dailyUsageRateFlag**

T_U8 dailyUsageRateFlag

Defines whether the daily usage rate should be considered during the cancel operation.

- ◆ **paymentInfo**

[ApexPaymentInfo](#) paymentInfo

Refund information and details.

- ◆ **price**

T_S32 price

Value, in cents, to be returned to the customer.

Note

This value must be positive. This field is defined as a T_S32, because all monetary values are defined this way.

◆ **productQuantity**

T_U32 productQuantity

Number of times that the equivalent of a product sale is going to be subtracted to the contract.

For example, if a 30 day monthly ticket is canceled with productQuantity = 2, then 60 days are going to be subtracted to the contract's end date.

Note

This is only used for monthly tickets without a counter.

◆ **salesPackageID**

T_S8

salesPackageID[K_APEX_SALES_PACKAGE_ID_MAX_SIZE]

Identifier of the sales package.

This ID is used to build the transaction and must match one defined in the commercial offer file.

◆ **unitsQuantity**

T_U32 unitsQuantity

Value that is going to be subtracted from the counter.

◆ usageDays

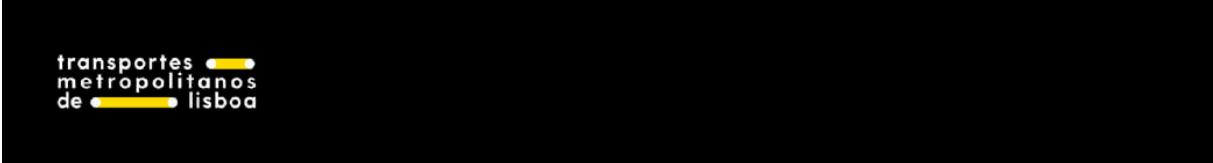
T_U16 usageDays

Number of days to which the daily usage rate will be applied.

Only considered if dailyUsageRateFlag is set to TRUE.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-



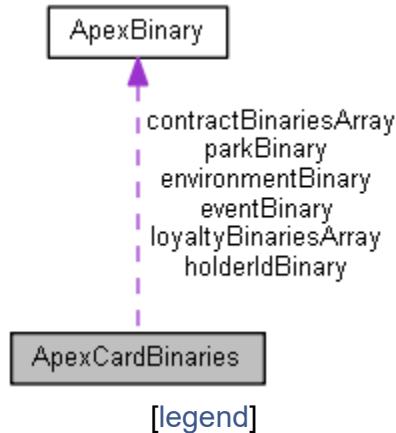
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ApexCardBinaries Struct Reference

Structure containing all binary data read from a card. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexCardBinaries:



[legend]

Data Fields

ApexBinary **environmentBinary**

Environment binary data. [More...](#)

ApexBinary **holderIdBinary**

Holder ID binary data. [More...](#)

ApexBinary **eventBinary**

Event binary data. [More...](#)

T_U16 maxContractBinaries

Maximum number of contract binaries that can be written to the card for this card type. [More...](#)

ApexBinary contractBinariesArray**[K_APEX_CONTRACTS_MAX_SIZE]**

Array of contract binaries (sparse array). [More...](#)

T_U16 maxLoyaltyBinaries

Maximum number of loyalty binaries that can be written to the card for this card type. [More...](#)

ApexBinary loyaltyBinariesArray**[K_APEX_LOYALTY_RECORDS_MAX_SIZE]**

Array of loyalty binaries (sparse array). [More...](#)

ApexBinary parkBinary

Park binary data. [More...](#)

Detailed Description

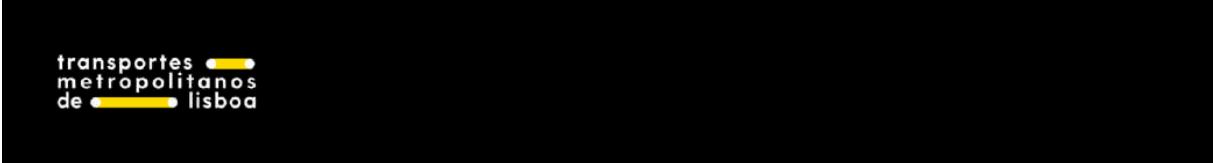
Structure containing all binary data read from a card.

See also

[ApexGetCardBinaries](#)

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



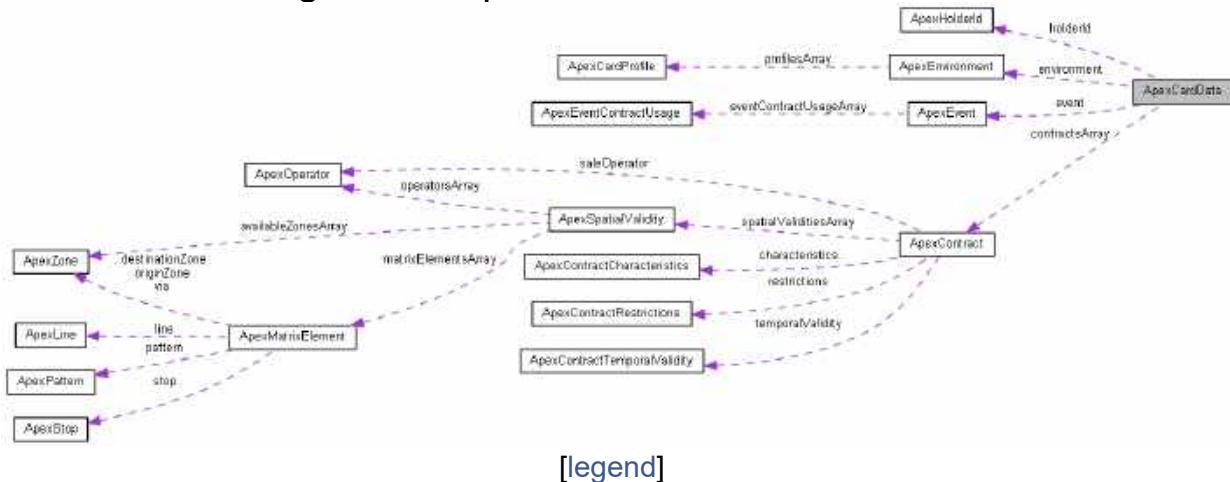
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ApexCardData Struct Reference

Structure containing the card data. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexCardData:



[legend]

Data Fields

ApexEnvironment environment

Specifies the public transport network environment and holder profiles, in which the card is used. [More...](#)

ApexHolderId holderId

Card holder identification. [More...](#)

T_U16 maxContracts

Maximum number of contracts that can be written to the card for this card type. [More...](#)

T_U16 contractsCount

Number of elements in the contracts array. [More...](#)

ApexContract * contractsArray

Array of contracts (dynamically allocated). [More...](#)

ApexEvent event

Transport event data structure (most recent event). [More...](#)

Detailed Description

Structure containing the card data.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



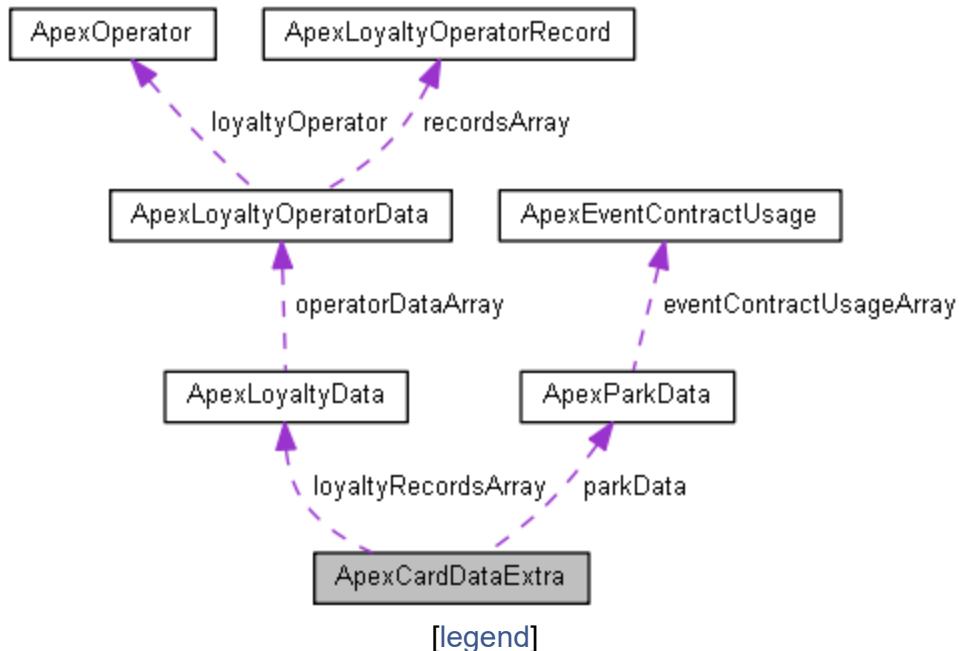
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metropolitanos
de [REDACTED] lisboa

ApexCardDataExtra Struct Reference

Structure containing the loyalty records and park data read from a card. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexCardDataExtra:



Data Fields

T_U16 **loyaltyRecordsCount**

Number of elements in the loyalty records array. [More...](#)

ApexLoyaltyData * loyaltyRecordsArray

Array of loyalty data records (dynamically allocated). [More...](#)

ApexParkData parkData

Card parking data. [More...](#)

Detailed Description

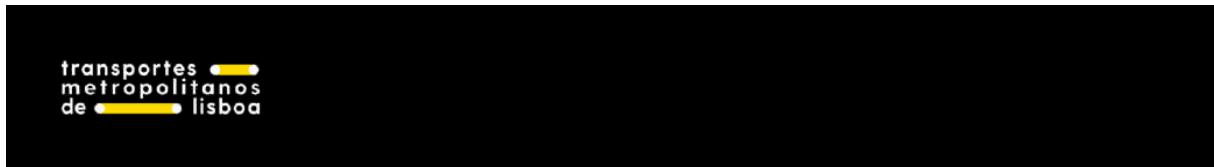
Structure containing the loyalty records and park data read from a card.

See also

[ApexReadCard](#)

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-





Data Fields

ApexCardDetectedInf o Struct Reference

Structure containing all data related to the detected card. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_CardPhysicalType	cardPhysicalType Physical type of the detected card. More...
--------------------	--

T_U64	cardSerialNumber Serial number of the detected card. More...
-------	--

T_CardValidityState	cardValidityState Indicates whether the card is in a valid state or if the application has been invalidated. More...
---------------------	--

T_CardFamily	cardFamily Family of the detected card. More...
--------------	---

T_U8	cardInfo [K_APEX_SELECT_APP_INFO_MAX_SIZE] Contains the card initial information. This information depends upon the type of the card detected: More...
------	--

T_U16 **cardInfoLength**

Length of the cardInfo byte array. [More...](#)

T_U8 **kvc**

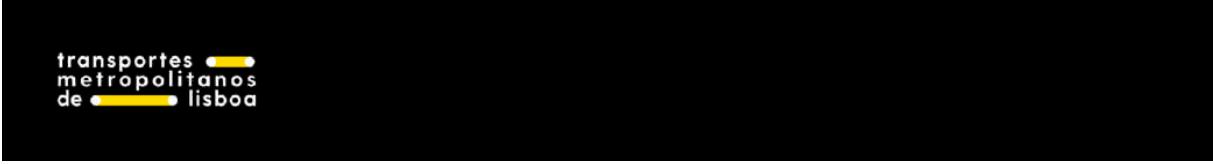
Key version and category of the selected application. [More...](#)

Detailed Description

Structure containing all data related to the detected card.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexCardInfo Struct Reference

Card information. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_CardPhysicalType [**cardPhysicalType**](#)
Card physical type. [More...](#)

T_CardDataModel [**cardDataModel**](#)
Card data model. [More...](#)

T_U64 [**cardSerialNumber**](#)
Card serial number. [More...](#)

T_CardValidityState [**cardValidityState**](#)
Indicates whether or not the card is valid.
[More...](#)

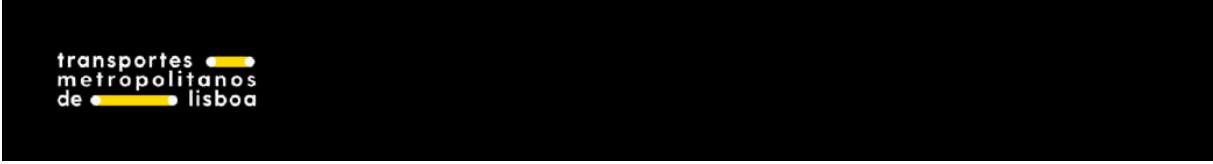
T_S8 [**cardTypeId**](#)
[[K_APEX_CARD_TYPE_ID_MAX_SIZE](#)]
Card type identifier. [More...](#)

Detailed Description

Card information.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexCardProfile Struct Reference

Data structure containing the data related to a card profile. More...

```
#include <apexGlb.h>
```

Data Fields

T_U16 **profileNumber**

Profile number. More...

T_S8 **profileId [K_APEX_PROFILE_ID_MAX_SIZE]**

Profile identifier. More...

T_S8 **profileName [K_APEX_PROFILE_NAME_MAX_SIZE]**

Profile name. More...

T_UtilDate **startDate**

Profile start date. More...

T_UtilDate **endDate**

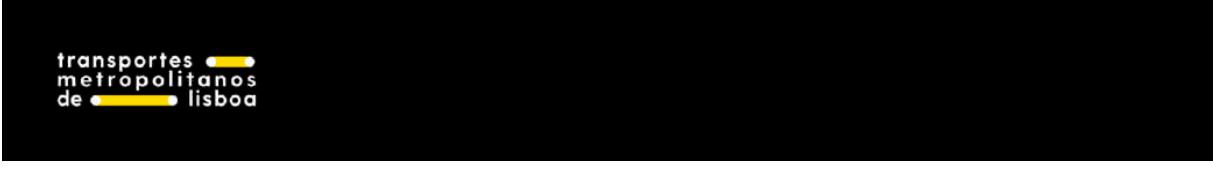
Profile expiration date. More...

Detailed Description

Data structure containing the data related to a card profile.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexCardReaderConfig Struct Reference

Data structure containing the required info to initialize a card reader.

[More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_U8 **id**

Arbitrary ID of the card reader. [More...](#)

T_CscType **cscType**

Reader CSC/Coupler type. [More...](#)

T_S8 **readerAddress**

[K_APEX_READER_ADDRESS_MAX_SIZE]

Card reader address. [More...](#)

T_U8 **antennaNumber**

Antenna number. [More...](#)

T_SearchMode **searchMode**

Card and ticket search mode. [More...](#)

T_CalypsoNativeMode **calypsoNativeMode**

Card reader Calypso Mode. [More...](#)

T_CouplerConfiguration * **couplerConfiguration**

Pointer to the structure with the Coupler Configuration. More...

Detailed Description

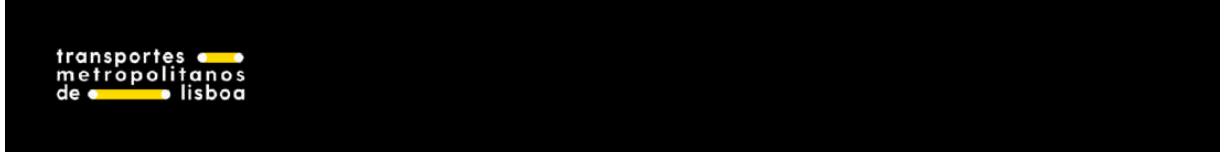
Data structure containing the required info to initialize a card reader.

See also

[ApexAddCardReader](#)

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexCardSamAssociation Struct Reference

Structure identifying which card and SAM readers are to be associated and how this association should be interpreted. [More...](#)

```
#include <apex.h>
```

Data Fields

T_U8 **cardReaderId**

ID of the previously added card reader to associate with a SAM reader. [More...](#)

T_U8 **samReaderId**

ID of the previously added SAM reader to associate with a card reader. [More...](#)

T_WorkingMode **workingMode**

Working mode of the API VIVA. [More...](#)

Detailed Description

Structure identifying which card and SAM readers are to be associated and how this association should be interpreted.

Field Documentation

◆ cardReaderId

T_U8 cardReaderId

ID of the previously added card reader to associate with a SAM reader.

See also

[ApexAddCardSamAssociation](#), [ApexAddCardReader](#)

◆ samReaderId

T_U8 samReaderId

ID of the previously added SAM reader to associate with a card reader.

See also

[ApexAddCardSamAssociation](#), [ApexAddSamReader](#)

◆ workingMode

T_WorkingMode workingMode

Working mode of the API VIVA.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-



transportes •
metropolitano
de • lisboa



Data Fields

ApexCardTypeld Struct Reference

Data structure containing a card type identifier. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **id [K_APEX_CARD_TYPE_ID_MAX_SIZE]**

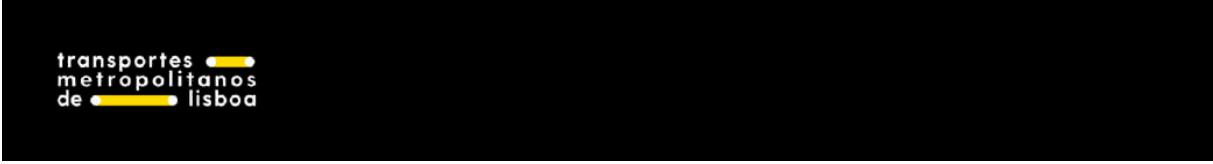
Identifier of the card type. [More...](#)

Detailed Description

Data structure containing a card type identifier.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



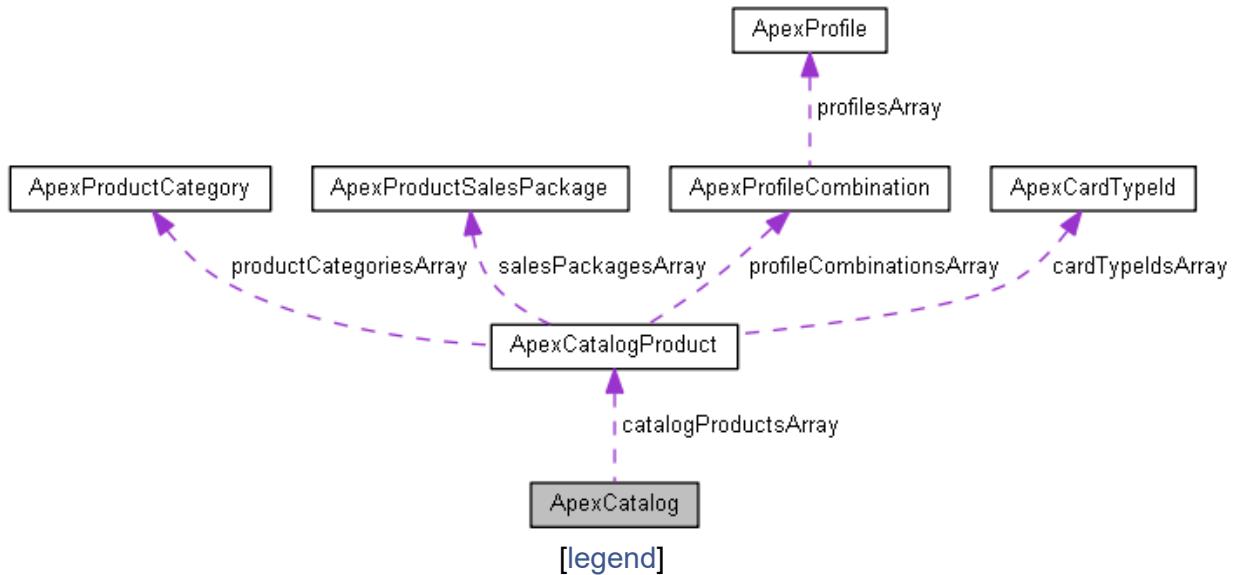
transportes [REDACTED]
metropolitano [REDACTED]
de [REDACTED] lisboa

ApexCatalog Struct Reference

Products catalog. [More...](#)

```
#include <apex.h>
```

Collaboration diagram for ApexCatalog:



Data Fields

T_U16 **catalogProductsCount**

Number of elements in the catalog products array. [More...](#)

ApexCatalogProduct * catalogProductsArray

Array of catalog products. [More...](#)

Detailed Description

Products catalog.

See also

[ApexCatalogProduct](#)

Field Documentation

◆ catalogProductsArray

ApexCatalogProduct* catalogProductsArray

Array of catalog products.

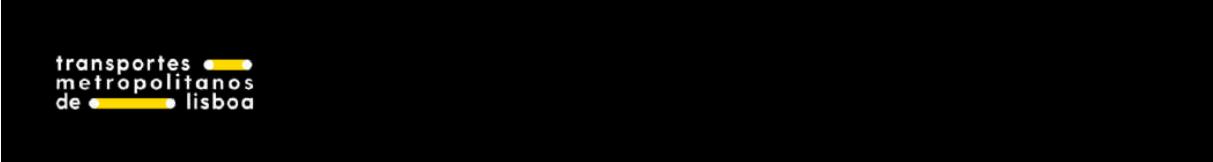
◆ catalogProductsCount

T_U16 catalogProductsCount

Number of elements in the catalog products array.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-



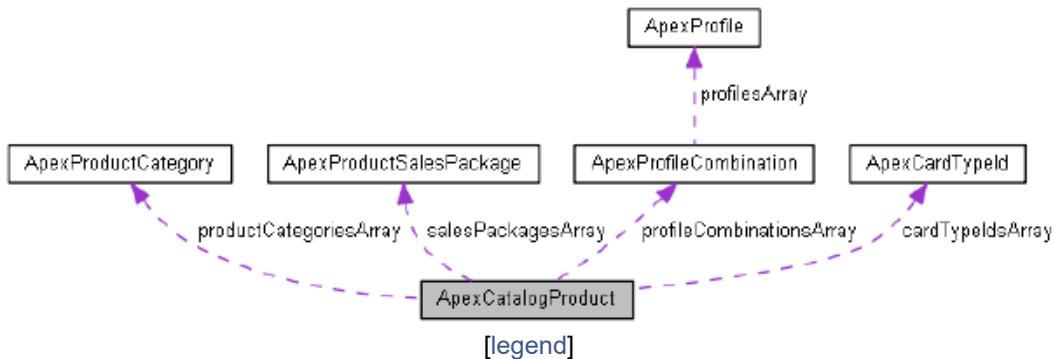
transportes [REDACTED]
metropolitano[s] [REDACTED]
de [REDACTED] lisboa

ApexCatalogProduct Struct Reference

Contains the sale details of a product. More...

```
#include <apexGlb.h>
```

Collaboration diagram for ApexCatalogProduct:



Data Fields

T_S8 **productId**
[K_APEX_PRODUCT_ID_MAX_SIZE]
Identifier of the product. More...

T_S8 **productName**
[K_APEX_PRODUCT_NAME_MAX_SIZE]
Name of the product. More...

T_U16 **productCategoriesCount**
Number of elements in the product category array. More...

ApexProductCategory * **productCategoriesArray**
Array of the product's categories. More...

T_U16 **cardTypeidsCount**

Number of elements in the card type ids array. [More...](#)

ApexCardTypeIds * [cardTypeIdsArray](#)

Array of card types valid for the product. [More...](#)

T_U16 [profileCombinationsCount](#)

Number of elements in the profile combination array. [More...](#)

ApexProfileCombination * [profileCombinationsArray](#)

Array of the profile combinations required by the product. [More...](#)

T_U16 [salesPackagesCount](#)

Number of elements in the sales packages array. [More...](#)

ApexProductSalesPackage * [salesPackagesArray](#)

Array of the product's sales packages. [More...](#)

ApexMaterializationType [materializationType](#)

Materialization type. [More...](#)

T_U8 [operationsAllowed](#)

[APEX_OPERATION_TYPE_MAX_VALUE]
Indicates which operations are allowed for this product.

Each element in the array represents a product operation, and its index is represented by the product operation value in the enumerated.

If the array element has a value of one (1), it indicates that the operation is allowed, otherwise it is prohibited. [More...](#)

T_VivaContractRightExtensionType [rightExtensionType](#)

Right extension type. [More...](#)

T_U8 [groupFlag](#)

Defines whether the product is a group ticket or not. [More...](#)

Detailed Description

Contains the sale details of a product.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexCatalogTransfer Parameters Struct Reference

Structure containing the required parameters to perform a contract transferral from a configured catalog product. [More...](#)

```
#include <apex.h>
```

Data Fields

T_S8 **configurationId**

[**K_APEX_CONFIGURATION_ID_MAX_SIZE**]

Product identifier obtained from the catalog product configuration. [More...](#)

T_S8 **corrCardTypeId** [**K_APEX_CARD_TYPE_ID_MAX_SIZE**]

Identifier of the malfunctioning card's type. [More...](#)

T_U8 **corrCardIssuer**

Card issuer of the malfunctioning card. [More...](#)

T_U32 **corrCardNumber**

Card number of the malfunctioning card. [More...](#)

T_U64 **corrCardSerialNumber**

Serial number of the malfunctioning card. [More...](#)

Detailed Description

Structure containing the required parameters to perform a contract transferral from a configured catalog product.

Field Documentation

◆ configurationId

T_S8

configurationId[K_APEX_CONFIGURATION_ID_MAX_SIZE]

Product identifier obtained from the catalog product configuration.

This field is mandatory.

◆ corrCardIssuer

T_U8 corrCardIssuer

Card issuer of the malfunctioning card.

Mandatory only for LisboaViva and VivaCard cards.

◆ corrCardNumber

T_U32 corrCardNumber

Card number of the malfunctioning card.

Mandatory only for LisboaViva and VivaCard cards.

◆ corrCardSerialNumber

T_U64 corrCardSerialNumber

Serial number of the malfunctioning card.

Mandatory only for Sete Colinas.

◆ corrCardTypeId

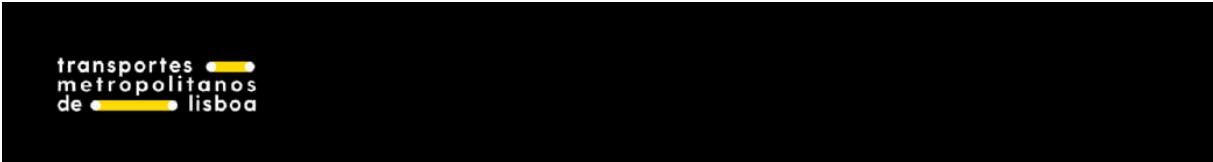
T_S8 corrCardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Identifier of the malfunctioning card's type.

This field is mandatory.

The documentation for this struct was generated from the following file:

- [apex.h](#)



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de  lisboa



Data Fields

ApexCheckConfigFilesInputParameters Struct Reference

[ApexCheckConfigFiles\(\)](#) input parameters. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **operatorId [K_APEX_OPERATOR_ID_MAX_SIZE]**

Operator identifier. This ID must match one defined in the Technical Parameters configuration file. [More...](#)

T_S8 **channelId [K_APEX_CHANNEL_ID_MAX_SIZE]**

Channel identifier. This ID must match one defined in the commercial offer configuration file. [More...](#)

T_S8 **techParamsFullFilename**

[K_APEX_FILE_PATH_MAX_SIZE]

Name and path of the technical parameters configuration file. [More...](#)

T_S8 **networkFullFilename [K_APEX_FILE_PATH_MAX_SIZE]**

Name and path of the network topology configuration file. [More...](#)

T_S8 **comOfferFullFilename [K_APEX_FILE_PATH_MAX_SIZE]**

Name and path of the commercial offer configuration file. [More...](#)

T_S8 **actionListsFullFilename**

[**K_APEX_FILE_PATH_MAX_SIZE**]

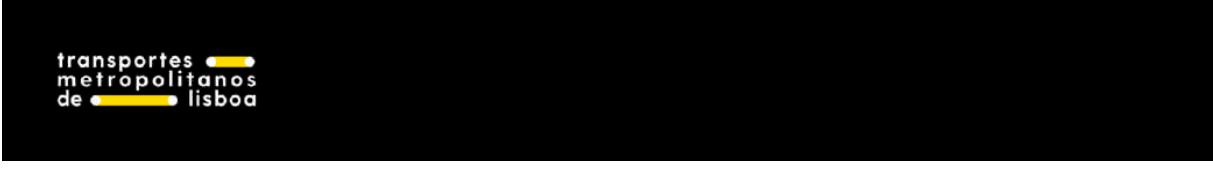
Name and path of the action lists configuration file. More...

Detailed Description

ApexCheckConfigFiles() input parameters.

The documentation for this struct was generated from the following file:

- **apexGlb.h**
-



A black rectangular redaction box covers the top portion of the slide content. Inside the box, there is a small, partially visible logo consisting of the words "transportes metropolitanos de lisboa" in white, sans-serif font, with a yellow horizontal bar graphic above the word "lisboa".

ApexConfigurePreSelectionParameters Struct Reference

Pre-selection configuration parameters. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_U8 contractNumber

Contract number (starting from 1) of the contract to which the pre-selection is going to be applied. [More...](#)

T_U8 isODPreSelectionFlag

Specifies an origin/destination or contract pre-selection. [More...](#)

Detailed Description

Pre-selection configuration parameters.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



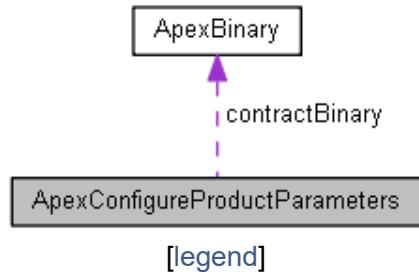
transportes [REDACTED]
metropolitano[s] [REDACTED]
de [REDACTED] lisboa

ApexConfigureProductParameters Struct Reference

Data structure containing all the input data required by the function [ApexConfigureProduct\(\)](#). More...

```
#include <apexGlb.h>
```

Collaboration diagram for ApexConfigureProductParameters:



[legend]

Data Fields

ApexConfigureProductMode **configureMode**
[ApexConfigureProduct\(\)](#) mode of operation. More...

T_S8 **productId**
[K_APEX_PRODUCT_ID_MAX_SIZE]
Product id. This identifier must correspond to one given by the catalog. More...

ApexBinary **contractBinary**
Contract binary. More...

T_S8 **cardTypeld**

[[K_APEX_CARD_TYPE_ID_MAX_SIZE](#)]
Card type ID. More...

T_U8 [cacheOptimizationFlag](#)

Optimizes the configuration process
using the cached data of the last card
read with [ApexRead\(\)](#). More...

Detailed Description

Data structure containing all the input data required by the function [ApexConfigureProduct\(\)](#).

Note

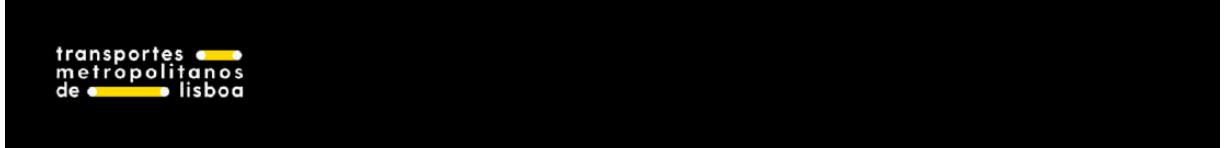
If the configured product (considering all its configurations) is already present in the card, a reload operation will be executed.

See also

[ApexConfigureProduct](#), [ApexLoad](#), [ApexTransfer](#)

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexConfirmCancelInfo Struct Reference

Structure containing information about the cancellation operation in progress. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8	productId [K_APEX_PRODUCT_ID_MAX_SIZE] Product identifier. More...
------	---

T_S8	productName [K_APEX_PRODUCT_NAME_MAX_SIZE] Product name. More...
------	---

T_UtilDate	saleDate Contract sale date. More...
------------	--

T_UtilDate	validityStartDate Contract validity start date. Empty if not defined or not used. More...
------------	---

T_UtilDate	validityEndDate Last valid day of the contract. Empty if not defined or not used. More...
------------	---

ApexContractDurationType	temporalUnitsType Type of the temporal validity units that will
---------------------------------	---

be removed. [More...](#)

T_U32 [temporalUnits](#)

Number of temporal validity units that will be removed. [More...](#)

ApexUnitType [unitType](#)

Type of units represented by the counter. [More...](#)

T_U32 [units](#)

Number of units in the counter that will be removed. [More...](#)

T_S32 [price](#)

Value, in cents, to be returned to the customer. [More...](#)

T_S32 [dailyUsageValue](#)

Total amount, in cents, of the daily usage value calculated by the product's corresponding daily usage rate. [More...](#)

Detailed Description

Structure containing information about the cancellation operation in progress.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



transportes [REDACTED]
metropolitano[s] [REDACTED]
de [REDACTED] lisboa



Data Fields

ApexConfirmTransfe rInfo Struct Reference

Structure containing information about the transferral operation in progress. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **productId** [[K_APEX_PRODUCT_ID_MAX_SIZE](#)]
Product identifier. [More...](#)

T_S8 **productName**
[[K_APEX_PRODUCT_NAME_MAX_SIZE](#)]
Product name. [More...](#)

T_UtilDate **saleDate**
Contract sale date. [More...](#)

T_UtilDate **validityStartDate**
Contract validity start date. Empty if not defined or not used. [More...](#)

T_UtilDate **validityEndDate**
Last valid day of the contract. Empty if not defined or not used. [More...](#)

ApexUnitType unitType

Type of units represented by the counter. [More...](#)

T_U32 units

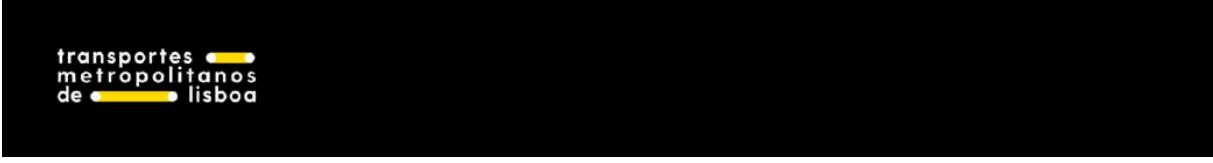
Number of units in the counter that will be transferred. [More...](#)

Detailed Description

Structure containing information about the transferral operation in progress.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



A black rectangular redaction box covering the logo of 'transportes [REDACTED] metropolitanos de [REDACTED] lisboa'.

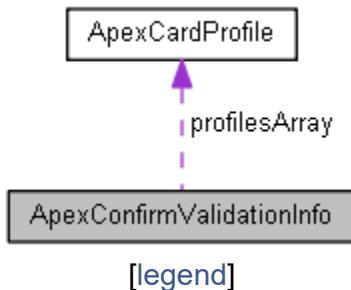
transportes [REDACTED]
metropolitanos
de [REDACTED] lisboa

ApexConfirmValidationInfo Struct Reference

Structure containing information about the validation operation in progress. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexConfirmValidationInfo:



[legend]

Data Fields

T_U8 profileValidationFlag

If TRUE (1), it indicates that the validation will be executed using a whitelist profile. Otherwise, it indicates that the validation will be performed by a contract. [More...](#)

T_S8 productId

[K_APEX_PRODUCT_ID_MAX_SIZE]

Product identifier. [More...](#)

T_S8 productName

[K_APEX_PRODUCT_NAME_MAX_SIZE]
Product name. [More...](#)

T_U32 unitsToDebit
Number of units to be debited. [More...](#)

T_U16 profilesCount
Number of elements in the profiles array.
[More...](#)

ApexCardProfile profilesArray
[K_APEX_PROFILES_MAX_SIZE]
Array of profiles to be used in the validation.
[More...](#)

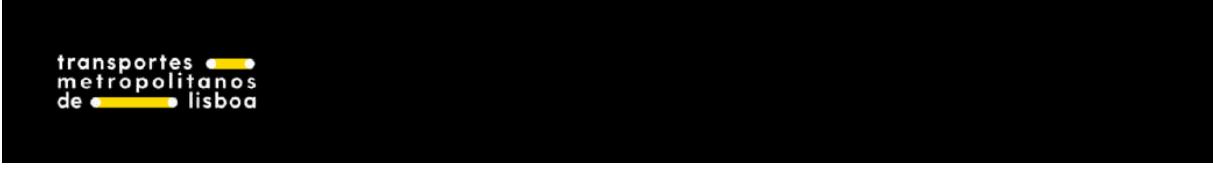
T_VivaEventType eventType
Event type (entry, exit, ...). [More...](#)

Detailed Description

Structure containing information about the validation operation in progress.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-

A black rectangular redaction box covering the logo of the organization. The logo consists of the text "transportes" followed by a yellow double circle icon, "metropolitano", another yellow double circle icon, and "lisboa".

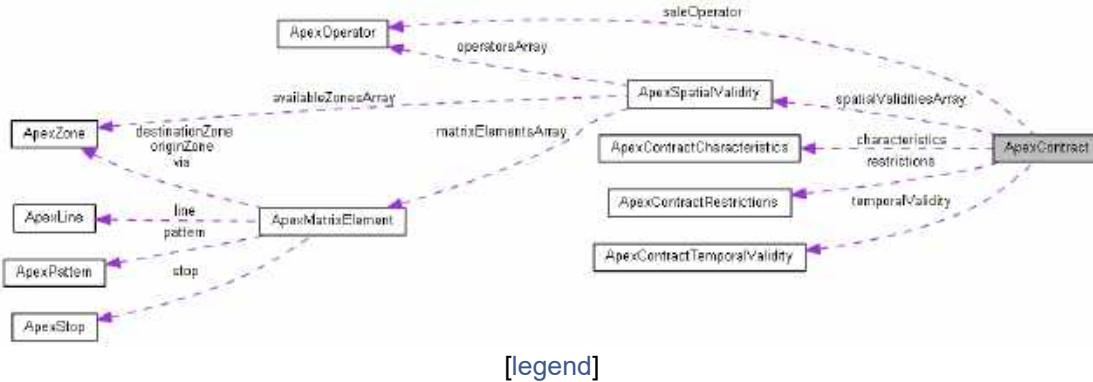
transportes ●●
metropolitano
de ●● lisboa

ApexContract Struct Reference

Apex contract data structure based on Viva v2 data model structure. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexContract:



Data Fields

T_U16 **contractNumber**
Contract number. [More...](#)

T_S8 **productId**
[K_APEX_PRODUCT_ID_MAX_SIZE]
Product identifier. [More...](#)

T_S8 **productName**
[K_APEX_PRODUCT_NAME_MAX_SIZE]
Product name. [More...](#)

ApexOperator **saleOperator**
Contract sale/load operator. [More...](#)

	T_S8 networkId [K_APEX_NETWORK_ID_MAX_SIZE] Identifier of the network where the contract is valid. More...
	T_UtilDate saleDate Contract sale date. More...
ApexContractTemporalValidity	temporalValidity Temporal validity. More...
ApexContractCharacteristics	characteristics Contract characteristics. More...
ApexContractRestrictions	restrictions Contract restrictions. More...
	T_U8 interchangeAllowedFlag Flag that defines whether interchange is allowed. More...
	T_U32 saleCount Contract loading equipment daily sale number. More...
	T_U32 saleSamMachineId Contract loading SAM (machine code) identifier. More...
	T_U16 spatialValiditiesCount Number of elements in the spatial validities array. More...
ApexSpatialValidity *	spatialValiditiesArray Array of spatial validity records (dinamically allocated). More...
	T_U32 contractUnits Contract units. More...

T_VivaContractRestrictTime **restrictTime**
Time period restrictions. [More...](#)

T_U8 **contractInGreylistFlag**
Indicates whether or not the contract is present in the greylist. [More...](#)

T_U8 **samInBlacklistFlag**
Indicates whether or not the SAM that loaded the contract is in the blacklist.
[More...](#)

T_U16 **requiredContractNumber**
Number of the base contract that this contract needs in order to be valid. [More...](#)

ApexPreValidationStatus **preValidationStatus**
Contract pre-validation status. [More...](#)

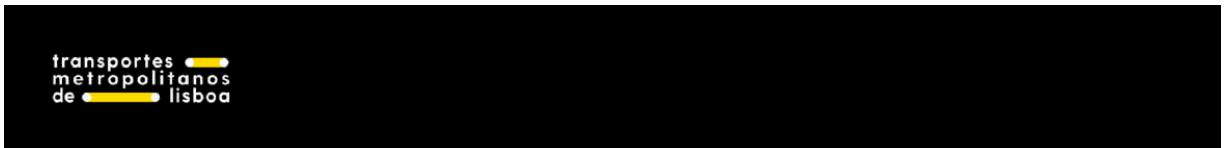
T_U8 **allowsReloadFlag**
Indicates whether this contract can currently be reloaded. [More...](#)

Detailed Description

Apex contract data structure based on Viva v2 data model structure.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



A black rectangular redaction box covers the top portion of the page content. Inside the box, at the top left, there is white text that appears to be a logo or watermark. The text reads "transportes" followed by a yellow double-headed arrow symbol, "metropolitano" followed by another yellow double-headed arrow symbol, "de" followed by a third yellow double-headed arrow symbol, and "lisboa" followed by a fourth yellow double-headed arrow symbol.



Data Fields

ApexContractCharacteristics Struct Reference

Structure that describes a contract's characteristics. More...

```
#include <apexGlb.h>
```

Data Fields

ApexUnitType **unitType**

Defines the type of contract units. More...

ApexMaterializationType **materializationType**

Product materialization type. More...

T_VivaContractRightExtensionType **rightExtensionType**

Product right extension type. More...

ApexTripClass **tripClass**

Trip class. More...

T_U8 **groupDimension**

Group dimension in case of a group contract. More...

T_U16 [timeBetweenPassengers](#)
Time (in seconds) allowed between passengers during a validation for a group contract. [More...](#)

T_U16 [dailyUsageRate](#)
Amount in cents to charge for each day of usage. [More...](#)

ApexPreSelectionType [preSelectionType](#)
Contract pre-selection type.
[More...](#)

ApexPreSelectionODType [preSelectionODType](#)
OD pre-selection type.
[More...](#)

Detailed Description

Structure that describes a contract's characteristics.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexContractRestrictions Struct Reference

Structure that describes a contract's restrictions. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_VivaContractUtilization	utilization Restricts the access of the contract. More...
---------------------------	--

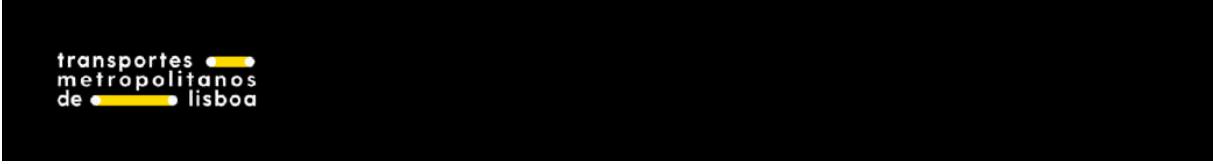
T_U16	maxDailyUsage Maximum number of daily usages of the contract. More...
-------	---

Detailed Description

Structure that describes a contract's restrictions.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



A black rectangular redaction box covers the top portion of the slide content. Inside the box, there is a small, partially visible logo consisting of the words "transportes metropolitanos de lisboa" in white, sans-serif font, with a yellow horizontal bar and two small circles above the word "lisboa".



Data Fields

ApexContractTemporalValidity Struct Reference

Structure that contains the data related to a contract's temporal validity. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_UtilDateTime	validityStartTime Contract validity start date and time. More...
----------------	---

ApexContractDurationType	contractDurationType Contract duration type. Gives meaning to the contractDuration field. More...
--------------------------	---

T_U16	contractDuration Contract duration value. More...
-------	---

ApexTripDurationType	tripDurationType Duration type of a single trip. Gives meaning to the tripDuration field. More...
----------------------	--

T_U16	tripDuration Duration value of a single trip.
-------	---

More...

Detailed Description

Structure that contains the data related to a contract's temporal validity.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



A black rectangular redaction box containing white text. The text reads "transportes" followed by two yellow dots, "metropolitano" followed by two yellow dots, "de" followed by a yellow dot, and "lisboa" followed by a yellow dot.

ApexControlFine Struct Reference

Control Fine. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **infractionNumber**
[K_APEX_INFRACTION_NUMBER_MAX_SIZE]
Infraction fine number. [More...](#)

T_S8 **fineOperatorId**
[K_APEX_OPERATOR_ID_MAX_SIZE]
Operator entity code. [More...](#)

T_S8 **offenderName**
[K_APEX_OFFENDER_NAME_MAX_SIZE]
Name of the offender. [More...](#)

T_UtilDate **offenderBirthDate**
Birth date of the offender. [More...](#)

T_S8 **offenderAddress**
[K_APEX_OFFENDER_ADDRESS_MAX_SIZE]
Address of the offender. [More...](#)

T_S8 **offenderPostalCode**
[K_APEX_OFFENDER_POSTAL_CODE_MAX_SIZE]
Postal code of the offender. [More...](#)

ApexDocumentType **offenderDocumentType**

		Identification document type of the offender. More...
T_S8	offenderIdentityNumber [K_APEX_IDENTITY_NUMBER_MAX_SIZE]	Identity number of the offender. More...
T_S8	offenderVatNumber [K_APEX_VAT_NUMBER_MAX_SIZE]	VAT number of the offender. More...
T_S8	infractionDescription [K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE]	Infraction description. More...
T_S8	infractionPlace [K_APEX_INFRACTION_PLACE_MAX_SIZE]	Locality where the infraction took place. More...
T_UtilDateTime	infractionDate	Infraction date. More...
T_UtilDateTime	infractionNoticeDate	Date of the emission of the fine. More...
ApexDocumentType	controllerDocumentType	Identification document type of the controller. More...
T_S8	controllerIdentityNumber [K_APEX_IDENTITY_NUMBER_MAX_SIZE]	Identity number of the controller. More...
ApexDocumentType	witnessDocumentType	Identification document type of the witness. More...
T_S8	witnessIdentityNumber [K_APEX_IDENTITY_NUMBER_MAX_SIZE]	Identity number of the witness. More...
T_S8	infractionId [K_APEX_INFRACTION_ID_MAX_SIZE]	Infraction identifier. More...

T_S8 **finId [K_APEX_FINE_ID_MAX_SIZE]**
Fine identifier. More...

T_S8 **attachedDocumentName
[K_APEX_DOCUMENT_NAME_MAX_SIZE]**
Attached document name. More...

ApexDocumentType **attachedDocumentType**
Attached document type. More...

T_S8 **attachedDocumentObs
[K_APEX_DOCUMENT_OBS_MAX_SIZE]**
Observations on the attached document. More...

T_S32 **fineAmount**
Fine amount applied. More...

Detailed Description

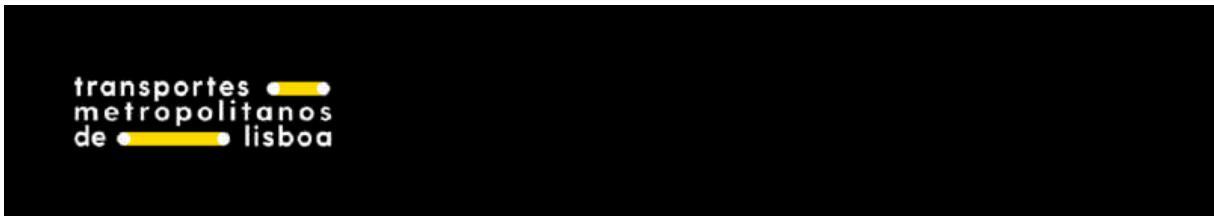
Control Fine.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



A large black rectangular redaction box covers the top portion of the page content. Inside this box, at the top left, is a small white text logo that reads "transportes metropolitano de lisboa". The word "transportes" is on the first line, "metropolitano" is on the second line, and "de lisboa" is on the third line, all in a sans-serif font.



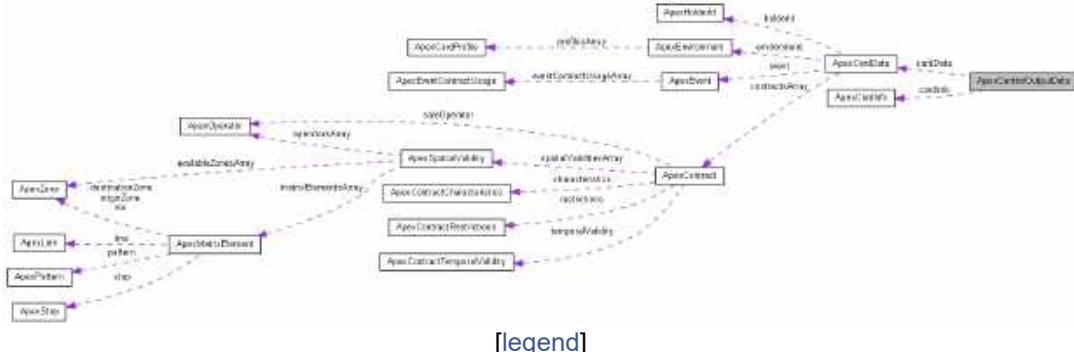
Data Fields

ApexControlOutputData Struct Reference

Structure containing all data related to the control operation and its result.
[More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexControlOutputData:



Data Fields

T_S8 **transactionId**
[K_APEX_TRANSACTION_ID_MAX_SIZE]
Control transaction unique identifier.
[More...](#)

ApexCardInfo cardInfo

Card information and details. More...

ApexCardData cardData
Contains the card data structures. More...

ApexControlEnvironmentStatus	environmentStatus Indicates the status of the control operation over the environment data. More...
-------------------------------------	--

T_U16 contractStatusCount

Number of elements in the contract status array. [More...](#)

ApexControlContractStatus contractStatusArray**[K_APEX_CONTRACTS_MAX_SIZE]**

Each element of the contractStatusArray identifies the control status of the respective contract present in the cardData.contractsArray. [More...](#)

T_U8 contractsInGreenlistFlag

Indicates whether or not the card has greenlist contracts waiting to be loaded.

[More...](#)**ApexControlWhitelistStatus whitelistStatus**

Indicates the status of the control operation over the data present in the whitelist.

[More...](#)**ApexControlStatus controlStatus**

Status code with the overall result of the control. [More...](#)

Detailed Description

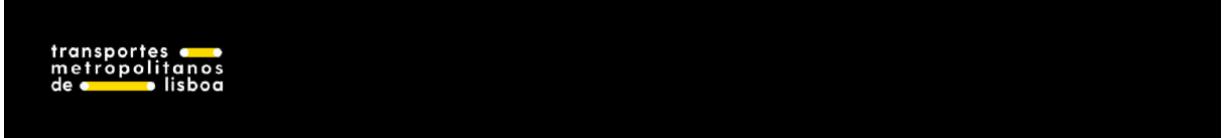
Structure containing all data data related to the control operation and its result.

See also

[ApexControl](#)

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



transportes [REDACTED]
metropolitanos
de [REDACTED] lisboa

ApexControlServiceL ocation Struct Reference

Control service location context. More...

```
#include <apex.h>
```

Data Fields

T_S8 **operationPlanId**
[K_APEX_OPERATION_PLAN_ID_MAX_SIZE]
Operation plan identifier. More...

T_S8 **blockId** [K_APEX_BLOCK_ID_MAX_SIZE]
Vehicle block identifier. More...

T_U32 **vehicleId**
Vehicle identifier. More...

T_S8 **dutyId** [K_APEX_DUTY_ID_MAX_SIZE]
Driver duty identifier. More...

T_S8 **journeyId** [K_APEX_JOURNEY_ID_MAX_SIZE]
Journey identifier. More...

T_S8 **extraJourneyId**
[K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE]
Extra Journey identifier. More...

T_S8 **lineId [K_APEX_LINE_ID_MAX_SIZE]**
Line identifier. More...

T_S8 **patternId [K_APEX_PATTERN_ID_MAX_SIZE]**
Pattern identifier. More...

T_S8 **originStopId [K_APEX_STOP_ID_MAX_SIZE]**
Identifier of the stop where the control service begins.
More...

T_S8 **destinationStopId [K_APEX_STOP_ID_MAX_SIZE]**
Identifier of the stop where the control service ends.
More...

Detailed Description

Control service location context.

Field Documentation

- ◆ **blockId**

T_S8 blockId[K_APEX_BLOCK_ID_MAX_SIZE]

Vehicle block identifier.

- ◆ **destinationStopId**

T_S8 destinationStopId[K_APEX_STOP_ID_MAX_SIZE]

Identifier of the stop where the control service ends.

Note

If destinationStopId has the same value of originStopId, this means that the control will only occur for the specified stop.

- ◆ **dutyId**

T_S8 dutyId[K_APEX_DUTY_ID_MAX_SIZE]

Driver duty identifier.

- ◆ **extraJourneyId**

T_S8

extraJourneyId[K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE]

Extra Journey identifier.

◆ **journeyId**

T_S8 journeyId[K_APEX_JOURNEY_ID_MAX_SIZE]

Journey identifier.

◆ **lineId**

T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE]

Line identifier.

◆ **operationPlanId**

T_S8

operationPlanId[K_APEX_OPERATION_PLAN_ID_MAX_SIZE]

Operation plan identifier.

◆ **originStopId**

T_S8 originStopId[K_APEX_STOP_ID_MAX_SIZE]

Identifier of the stop where the control service begins.

◆ **patternId**

T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE]

Pattern identifier.

◆ **vehicleId**

T_U32 vehicleId

Vehicle identifier.

The documentation for this struct was generated from the following file:

- [apex.h](#)





Data Fields

ApexDamagedCardInfo Struct Reference

Damaged card information. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **cardTypeId [K_APEX_CARD_TYPE_ID_MAX_SIZE]**
Identifier of the damaged card's type. [More...](#)

T_U8 **cardIssuer**
Card issuer. [More...](#)

T_U32 **cardNumber**
Card number. [More...](#)

T_U64 **cardSerialNumber**
Card serial number. [More...](#)

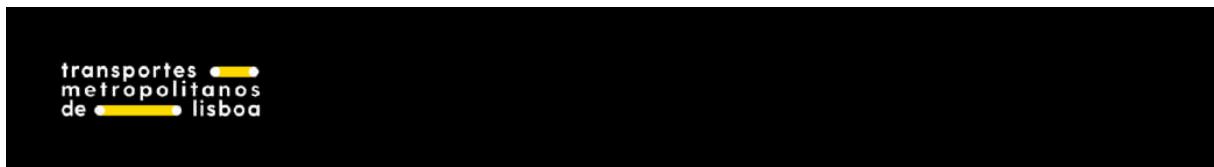
Detailed Description

Damaged card information.

A damaged card is a card that is not controllable by the call to ApexControl, because it is unreadable due to being damaged.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-

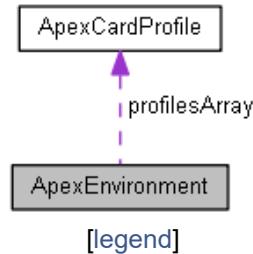


ApexEnvironment Struct Reference

Card environment data structure. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexEnvironment:



[legend]

Data Fields

T_S8 **applicationIssuerId**
[K_APEX_OPERATOR_ID_MAX_SIZE]
Application issuer operator identifier. [More...](#)

T_U16 **applicationIssuerCode**
Application issuer operator code. [More...](#)

T_S8 **applicationIssuerName**
[K_APEX_OPERATOR_NAME_MAX_SIZE]
Application issuer operator name. [More...](#)

T_S8 **applicationIssuerShortName**
[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE]
Application issuer operator short name. [More...](#)

T_S8 **networkId** [K_APEX_NETWORK_ID_MAX_SIZE]
Network identifier. [More...](#)

T_U32	cardNumber Unique card number by issuer. More...
T_VivaMediaType	mediaType Form factor of the portable object. More...
T_VivaGraphicalLayout	graphicalLayout Graphical layout of the card. More...
T_UtilDate	issuingDate Application issuing date. More...
T_UtilDate	endDate Application expiration date. More...
T_UtilDate	rehabilitationDate Application rehabilitation date. More...
T_U16	countryCode Country ISO-3166 code. More...
T_U16	currencyCode Currency ISO-4217 code. More...
T_U16	holderCompany Identifier of the company where the holder works. More...
T_S8	holderCompanyName [K_APEX_OPERATOR_NAME_MAX_SIZE] Name of the company where the holder works. More...
T_S8	holderCompanyShortName [K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE] Short name of the company where the holder works. More...
T_U32	holderNumber

Holder number. [More...](#)

T_UtilDate **holderBirthDate**
Holder birth date. [More...](#)

T_U16 **profilesCount**
Number of holder profile data entries. (0..7). [More...](#)

ApexCardProfile * **profilesArray**
Array of holder profiles (dynamically allocated).
[More...](#)

T_U8 **issuerDataSize**
Issuer data size (in bits). [More...](#)

T_U8 **issuerData** [**K_APEX_ISSUER_DATA_MAX_SIZE**]
Issuer specific data. [More...](#)

Detailed Description

Card environment data structure.

If the card has the K_CARD_DATAMODEL_LISBOA_VIVA_V_1 data model all fields may be considered. If the card has the K_CARD_DATAMODEL_LISBOA_VIVA_V_0 data model, the relevant data is as follows:

Field	Note
applicationIssuerId	-
applicationIssuerName	-
applicationIssuerShortName	-
networkId	-
cardNumber	-
dataModel	-
issuingDate	-
endDate	-
countryCode	-
currencyCode	-
holderCompany	-
holderNumber	-
holderBirthDate	-
profilesArraySize	-
profilesArray	Only a maximum of 3 are available for this data model.

The documentation for this struct was generated from the following file:

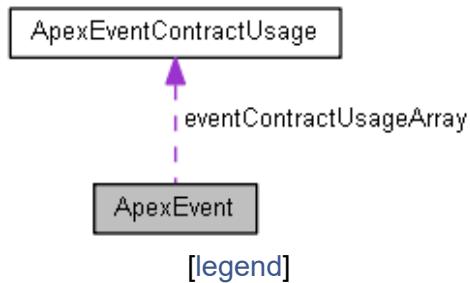
- [apexGlb.h](#)
-

ApexEvent Struct Reference

Apex event data structure. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexEvent:



Data Fields

`T_UtilDateTime` **eventDateTime**

Date and time of the event. [More...](#)

`T_VivaEventType` **eventType**

Type of the event. [More...](#)

`T_S8` **eventOperatorId**

`[K_APEX_OPERATOR_ID_MAX_SIZE]`

Event operator identifier. [More...](#)

`T_S8` **networkId**

`[K_APEX_NETWORK_ID_MAX_SIZE]`

Network where the event occurred.

[More...](#)

T_U8 **journeyInterchanges**
Interchange counter. [More...](#)

T_S8 **lineId** [**K_APEX_LINE_ID_MAX_SIZE**]
Line identifier. [More...](#)

T_S8 **patternId**
[**K_APEX_PATTERN_ID_MAX_SIZE**]
Pattern identifier. [More...](#)

T_S8 **stopId**
[**K_APEX_STOP_ID_MAX_SIZE**]
Stop identifier. [More...](#)

T_U16 **vehicleId**
Vehicle identifier. [More...](#)

T_S8 **originZoneId**
[**K_APEX_ZONE_ID_MAX_SIZE**]
Origin zone identifier. [More...](#)

T_S8 **destinationZoneId**
[**K_APEX_ZONE_ID_MAX_SIZE**]
Destination zone identifier. [More...](#)

T_U16 **contractsUsedMask**
Mask with the contracts used in the validation. [More...](#)

T_U8 **profilesUsedMask**
Mask with the profiles used in the validation. [More...](#)

T_U32 **deviceId**

Device identifier. [More...](#)

T_U16 **eventContractUsageCount**

Number of elements in the event contract usage array. [More...](#)

ApexEventContractUsage * **eventContractUsageArray**

Event contract usage data structure (dynamically allocated). [More...](#)

T_U8 **issuerDataSize**

Issuer data size (in bits). [More...](#)

T_U8 **issuerData**

[**K_APEX_ISSUER_DATA_MAX_SIZE**]

Issuer specific data. [More...](#)

Detailed Description

Apex event data structure.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexEventContractUsage Struct Reference

Structure containing the information on the usage of a contract.

[More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_U8 **contractNumber**

Contract number. [More...](#)

T_UtilDateTime **firstDateTime**

Date and time of the latest trip. [More...](#)

T_U8 **usageData**

Usage data. [More...](#)

T_U8 **periodStart**

Start of the period for limited trips. [More...](#)

T_U8 **periodRemainingTrips**

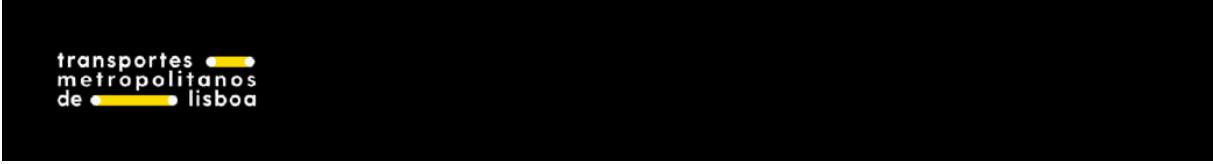
Number of remaining trips. [More...](#)

Detailed Description

Structure containing the information on the usage of a contract.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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transportes ● ●
metropolitano
de ● ● lisboa

ApexFileHeaderInfo Struct Reference

Describes the common data of the configuration files' header. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **fileFormatVersion**
[K_APEX_FILE_VERSION_MAX_SIZE]
File format version. [More...](#)

T_S8 **fileVersion**
[K_APEX_FILE_VERSION_MAX_SIZE]
File version. [More...](#)

T_UtilDateTime **fileDate**
File generation date. [More...](#)

T_UtilDateTime **fileStartDate**
File validity start date. [More...](#)

T_UtilDateTime **fileEndDate**
File validity end date. [More...](#)

T_S8 **apexMinVersion**
[K_APEX_LIBRARY_VERSION_MAX_SIZE]

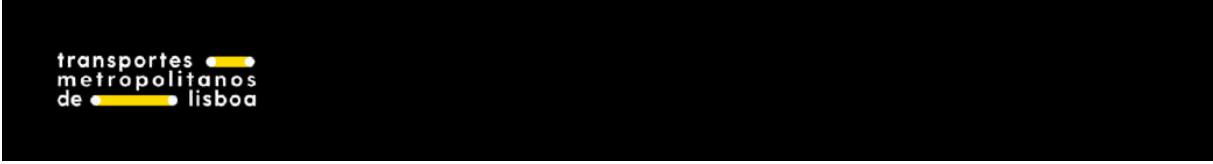
API-APEX version. [More...](#)

Detailed Description

Describes the common data of the configuration files' header.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



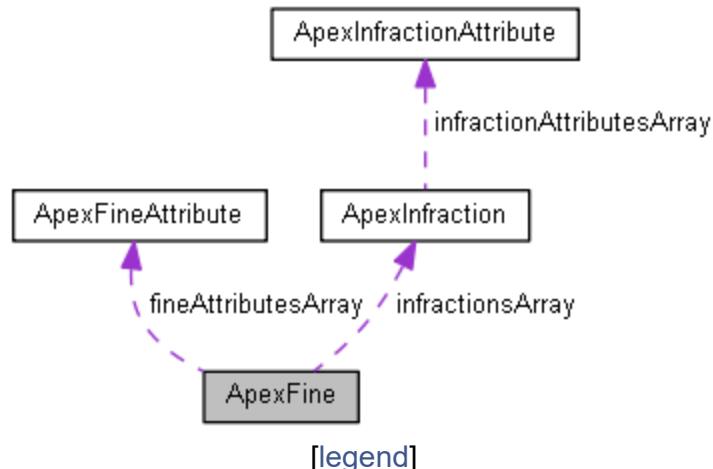
transportes [REDACTED]
metropolitano[s] [REDACTED]
de [REDACTED] lisboa

ApexFine Struct Reference

Fine. More...

```
#include <apexGlb.h>
```

Collaboration diagram for ApexFine:



[legend]

Data Fields

T_S8 **id** [K_APEX_FINE_ID_MAX_SIZE]
Fine identifier. More...

T_S8 **description**
[K_APEX_FINE_DESCRIPTION_MAX_SIZE]
Fine description. More...

T_U16 **fineAttributesCount**

Number of elements in the fine attributes array. [More...](#)

ApexFineAttribute * **fineAttributesArray**

Array of fine attributes. [More...](#)

T_U16 **infractionsCount**

Number of elements in the infractions array.
[More...](#)

ApexInfraction * **infractionsArray**

Array of infractions. [More...](#)

T_S32 **minAmount**

Minimum fine amount in cents. [More...](#)

T_S32 **maxAmount**

Maximum fine amount in cents. [More...](#)

T_S32 **promptAmount**

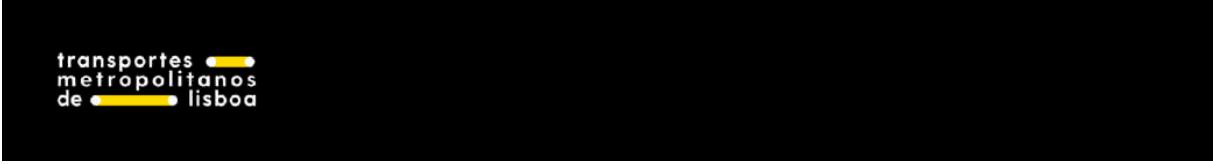
Fine amount in the case of immediate payment. [More...](#)

Detailed Description

Fine.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexFineAttribute Struct Reference

Fine attribute. More...

```
#include <apexGlb.h>
```

Data Fields

T_S8 **id [K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE]**

Fine attribute identifier. More...

T_S8 **description**

[K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_SIZE]

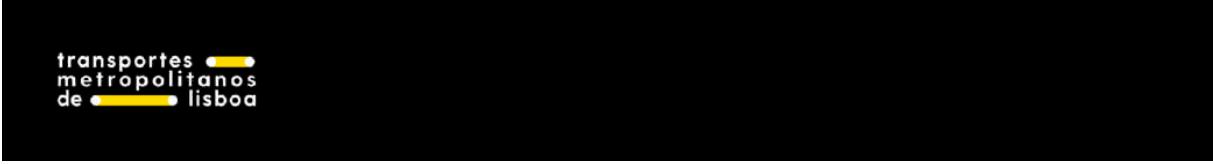
Fine attribute description. More...

Detailed Description

Fine attribute.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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metropolitano[s] [REDACTED]
de [REDACTED] lisboa

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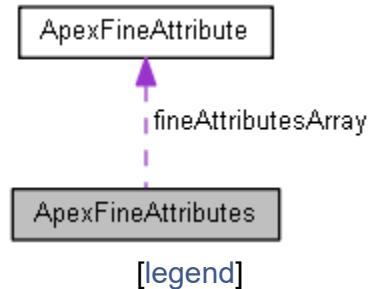
Data Fields

ApexFineAttributes Struct Reference

Fine attributes array. [More...](#)

```
#include <apex.h>
```

Collaboration diagram for ApexFineAttributes:



[legend]

Data Fields

T_U16 **fineAttributesCount**

Number elements of the fine attributes array. [More...](#)

ApexFineAttribute * fineAttributesArray

Array of available fine attributes. [More...](#)

Detailed Description

Fine attributes array.

Note

API-APEX takes full responsibility with allocating and freeing the space required for the fine attributes array.

Field Documentation

◆ fineAttributesArray

ApexFineAttribute* fineAttributesArray

Array of available fine attributes.

◆ fineAttributesCount

T_U16 fineAttributesCount

Number elements of the fine attributes array.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-



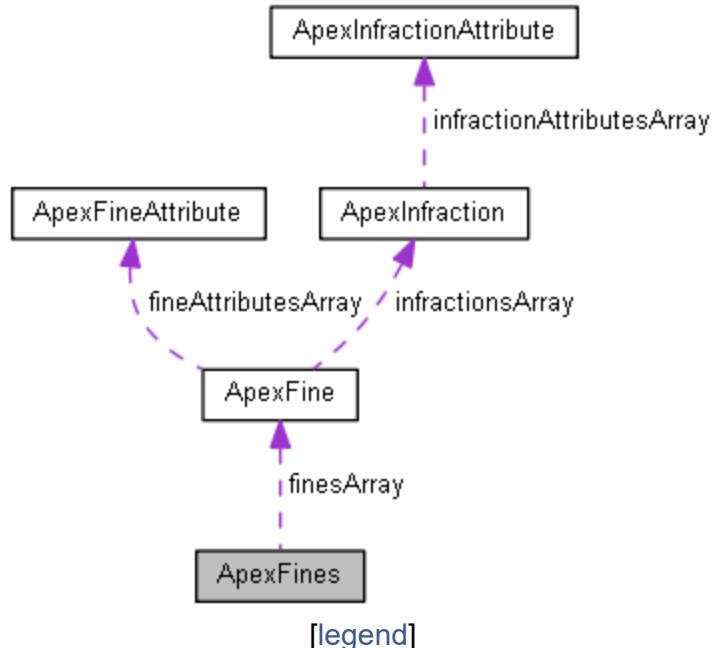
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ApexFines Struct Reference

Fines array. [More...](#)

```
#include <apex.h>
```

Collaboration diagram for ApexFines:



[\[legend\]](#)

Data Fields

T_U16 finesCount

Number of elements in the fines array. [More...](#)

ApexFine * finesArray

Array of fines. [More...](#)

Detailed Description

Fines array.

Note

API-APEX takes full responsibility with allocating and freeing the space required for the fines array.

Field Documentation

◆ finesArray

ApexFine* finesArray

Array of fines.

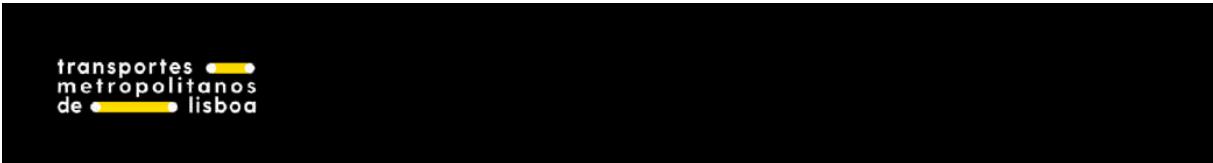
◆ finesCount

T_U16 finesCount

Number of elements in the fines array.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-



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Data Fields

ApexGetCatalogParameters Struct Reference

[ApexGetCatalog\(\)](#) input parameters. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_U8 **cardFilterFlag**

Filter catalog based on the card read. Only products suitable for the card are returned. [More...](#)

T_U8 **cacheOptimizationFlag**

Optimizes the operation using the cached data of the last card read with [ApexRead\(\)](#). [More...](#)

T_U8 **locationFilterFlag**

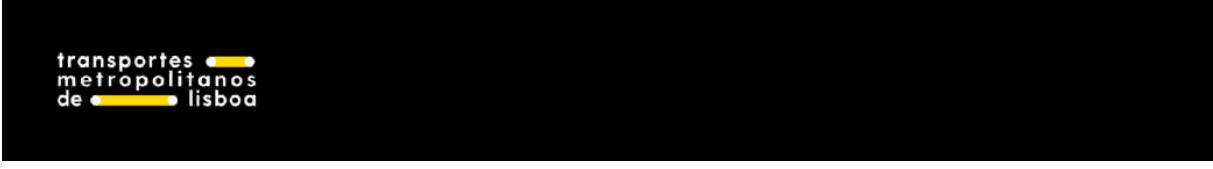
Filter the catalog's onboard ticket products based on the current location. [More...](#)

Detailed Description

ApexGetCatalog() input parameters.

The documentation for this struct was generated from the following file:

- **apexGlb.h**
-



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de [REDACTED] lisboa

ApexGetFinesInputParameters Struct Reference

[ApexGetFines\(\)](#) input parameters. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **fineAttributId**
[\[K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE\]](#)
Fine attribute identifier. [More...](#)

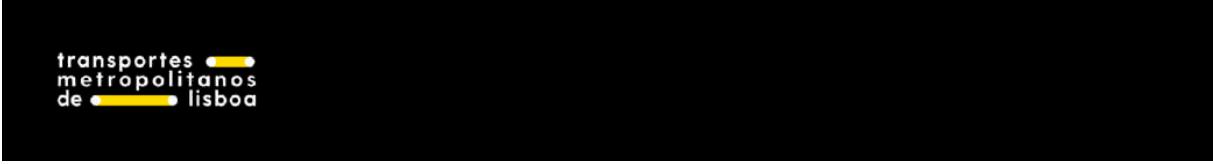
T_S8 **infractionId** [\[K_APEX_INFRACTION_ID_MAX_SIZE\]](#)
Infraction identifier. [More...](#)

Detailed Description

ApexGetFines() input parameters.

The documentation for this struct was generated from the following file:

- **apexGlb.h**
-



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ApexGetInfrctionsInputParameters Struct Reference

[ApexGetInfrctions\(\)](#) input parameters. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8	infractionAttributeId [K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE] Infraction attribute identifier. More...
------	--

ApexControlEnvironmentStatus	environmentStatus Environment control status. More...
-------------------------------------	---

ApexControlContractStatus	contractStatus Contract control status. More...
----------------------------------	---

Detailed Description

[ApexGetInfractions\(\)](#) input parameters.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexGetLinesInputParameters Struct Reference

[ApexGetLines\(\)](#) input parameters. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **lineId** [[K_APEX_LINE_ID_MAX_SIZE](#)]
Line filter. [More...](#)

T_S8 **patternId** [[K_APEX_LINE_ID_MAX_SIZE](#)]
Pattern filter. [More...](#)

T_U8 **includePatternsFlag**
Defines whether the output contains the patterns for each line. [More...](#)

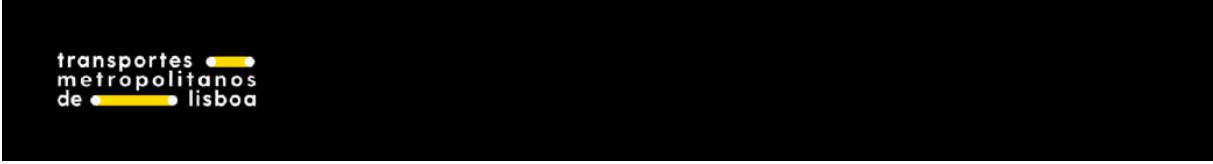
T_U8 **includeStopsFlag**
Defines whether the output contains the stops for each pattern. [More...](#)

Detailed Description

ApexGetLines() input parameters.

The documentation for this struct was generated from the following file:

- **apexGlb.h**
-



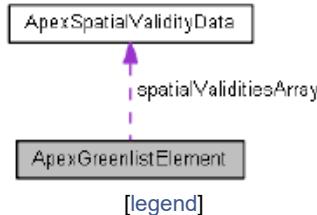
transportes [REDACTED]
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de [REDACTED] lisboa

ApexGreenlistElement Struct Reference

Information of the Greenlist element. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexGreenlistElement:



Data Fields

T_S8 **greenlistItemId**
[[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE](#)]
Identifier of the greenlist element. [More...](#)

T_S8 **cardTypeId** [[K_APEX_CARD_TYPE_ID_MAX_SIZE](#)]
Card type identifier. [More...](#)

T_U64 **cardSerialNumber**
Card serial number. [More...](#)

T_S8 **productLongId** [[K_APEX_PRODUCT_ID_MAX_SIZE](#)]
Product to which this greenlist element is applied. [More...](#)

T_S8 **authorizationId**
[[K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_SIZE](#)]
Authorization identifier. [More...](#)

T_S8 **salesPackageld**
[[K_APEX_SALES_PACKAGE_ID_MAX_SIZE](#)]
Product sales package identifier. [More...](#)

T_U32 **spatialValiditiesCount**
Number of entries in the spatialValiditiesArray. [More...](#)

ApexSpatialValidityData * spatialValiditiesArray

Array of spatial validity associations. [More...](#)

T_UtilDateTime contractStartDate

Start date of the greenlist element contract. [More...](#)

T_U8 onlineCheckFlag

Indicates whether online checks are mandatory for this greenlist element (boolean). [More...](#)

T_S8 personalizationId

[K_APEX_PERSONALIZATION_ID_MAX_SIZE]

Personalization identifier (future use). [More...](#)

Detailed Description

Information of the Greenlist element.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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de  lisboa



Data Fields

ApexGreenlistLoadParameters Struct Reference

Greenlist load input parameters. More...

```
#include <apex.h>
```

Data Fields

T_U8 cacheOptimizationFlag

Optimizes the configuration process using the cached data of the last card read with **ApexRead()**. More...

Detailed Description

Greenlist load input parameters.

Field Documentation

◆ cacheOptimizationFlag

T_U8 cacheOptimizationFlag

Optimizes the configuration process using the cached data of the last card read with [ApexRead\(\)](#).

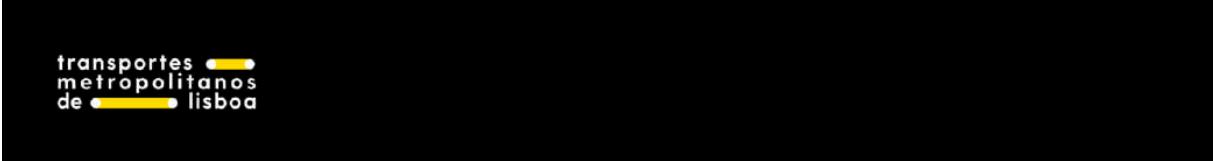
If set to TRUE, ApexGreenlistLoad will use the cached data from the previously card read, if available. If set to FALSE, ApexGreenlistLoad will detect and read the card when called.

See also

[ApexRead](#)

The documentation for this struct was generated from the following file:

- [apex.h](#)
-



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metropolitano[s] [REDACTED]
de [REDACTED] lisboa



Data Fields

ApexGreylistElement Struct Reference

Information of the Greylist element. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **greylistItemId**
[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]
Identifier of the greylist element. [More...](#)

T_S8 **cardTypeId**
[K_APEX_CARD_TYPE_ID_MAX_SIZE]
Card type identifier. [More...](#)

T_U64 **cardSerialNumber**
Card serial number. [More...](#)

T_S8 **productLongId**
[K_APEX_PRODUCT_ID_MAX_SIZE]
Product to which this greylist element is applied.
[More...](#)

T_U8 **hasMachineCode**
Indicates if the "machineCode" field was set.
[More...](#)

T_U16 machineCode
Loading machine code. [More...](#)

T_U8 hasLoadDate
Indicates if the "loadDate" field was set. [More...](#)

T_UtilDate loadDate
Ticket load date. [More...](#)

T_U8 hasLoadSequenceNumber
Indicates if the "loadSequenceNumber" field was set. [More...](#)

T_U16 loadSequenceNumber
Ticket load sequence number. [More...](#)

T_U8 hasCardDataModel
Indicates if the "cardDataModel" field was set.
[More...](#)

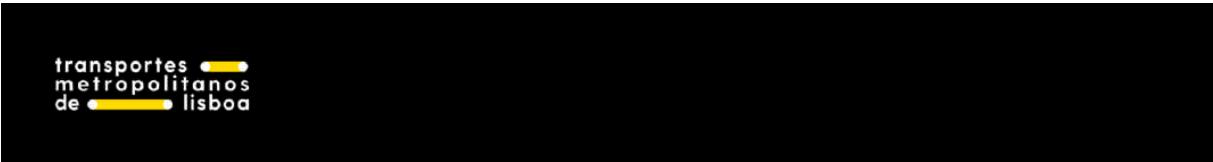
T_CardDataModel cardDataModel
Card data model. [More...](#)

Detailed Description

Information of the Greylist element.

The documentation for this struct was generated from the following file:

- **apexGlb.h**
-



transportes ■■■
metropolitanos
de ■■■ lisboa



Data Fields

ApexHolderId Struct Reference

Apex holder identification data structure. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_U32 **civilNumber**
Holder civil number. [More...](#)

T_U32 **vatNumber**
Holder VAT number. [More...](#)

T_S8 **name [K_APEX HOLDER NAME MAX SIZE]**
Holder name. [More...](#)

T_U8 **issuerDataSize**
Issuer data size (in bits). [More...](#)

T_U8 **issuerData [K_APEX_ISSUER_DATA_MAX_SIZE]**
Issuer specific data. [More...](#)

Detailed Description

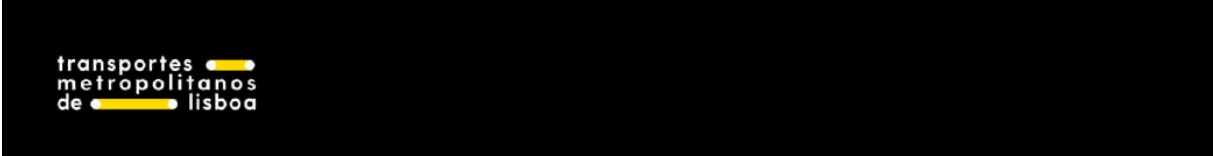
Apex holder identification data structure.

If the card has the K_CARD_DATAMODEL_LISBOA_VIVA_V_1 data model all fields may be considered. If the card has the K_CARD_DATAMODEL_LISBOA_VIVA_V_0 data model, the relevant data is as follows:

Field	Note
name	The maximum allowed length is K HOLDER_ID_PERS_NAME_MAX_BYTES including the null terminator.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



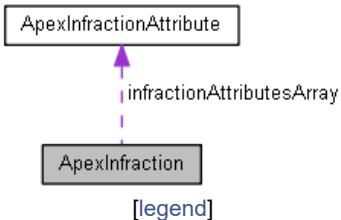
transportes [REDACTED]
metropolitano[s]
de [REDACTED] lisboa

ApexInfraction Struct Reference

Infraction. More...

```
#include <apexGlb.h>
```

Collaboration diagram for ApexInfraction:



Data Fields

T_S8 **id** [**K_APEX_INFRACTION_ID_MAX_SIZE**]
Infraction identifier. More...

T_S8 **description**
[**K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE**]
Infraction description. More...

T_U16 **infractionAttributesCount**
Number of elements in the infraction attributes array. More...

ApexInfractionAttribute * **infractionAttributesArray**
Array of infraction attributes. More...

T_U8 **contractStatusMask**
[**APEX_CONTROL_CONTRACT_STATUS_MAX_VALUE**]
Array of booleans indicating which contract status are associated. Each index of the array is directly associated to an ApexControlContractStatus value. More...

T_U8 **environmentStatusMask**
[**APEX_CONTROL_ENVIRONMENT_STATUS_MAX_VALUE**]
Array of booleans indicating which environment status are associated. Each index of the array is directly associated to an ApexControlEnvironmentStatus value. More...

T_S8 **procedure**
[K_APEX_INFRACTION PROCEDURE MAX SIZE]
Pocedure to follow in the case of the infraction. [More...](#)

Detailed Description

Infraction.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



transportes [REDACTED]
metropolitanos
de [REDACTED] lisboa

ApexInfractionAttribute Struct Reference

Infraction attribute. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **id** [K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE]
Infraction attribute identifier. [More...](#)

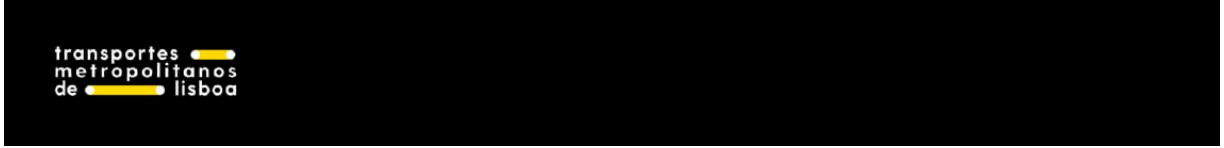
T_S8 **description**
[K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_SIZE]
Infraction attribute description. [More...](#)

Detailed Description

Infraction attribute.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



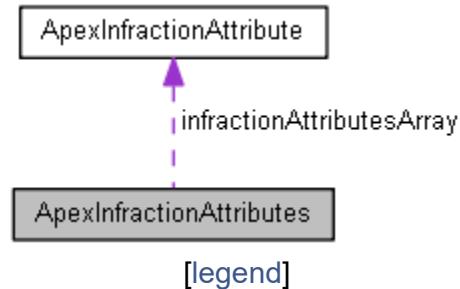
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ApexInfractionAttributes Struct Reference

Infraction attributes array. [More...](#)

```
#include <apex.h>
```

Collaboration diagram for ApexInfractionAttributes:



Data Fields

T_U16 **infractionAttributesCount**

Number elements of the infraction attributes array. [More...](#)

ApexInfractionAttribute * infractionAttributesArray

Array of available infraction attributes. [More...](#)

Detailed Description

Infraction attributes array.

Note

API-APEX takes full responsibility with allocating and freeing the space required for the infraction attributes array.

Field Documentation

◆ **infractionAttributesArray**

ApexInfractionAttribute* infractionAttributesArray

Array of available infraction attributes.

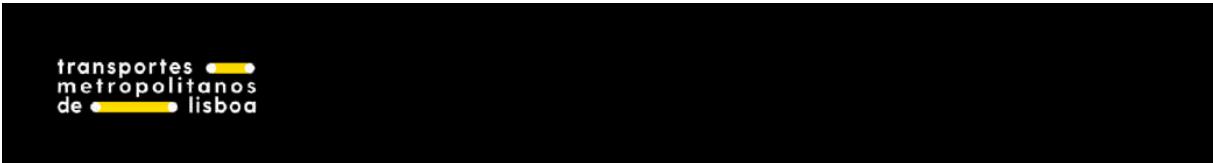
◆ **infractionAttributesCount**

T_U16 infractionAttributesCount

Number elements of the infraction attributes array.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-



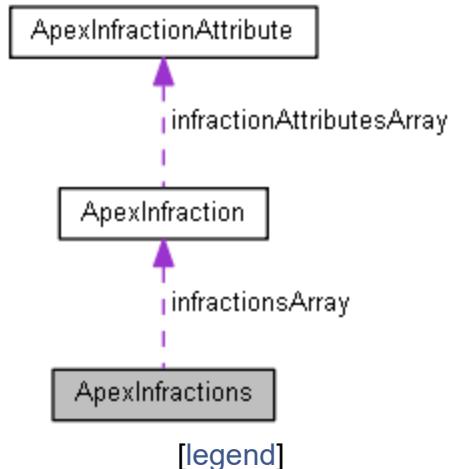
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de  lisboa

ApexInfracciones Struct Reference

Infractions array. [More...](#)

```
#include <apex.h>
```

Collaboration diagram for ApexInfracciones:



Data Fields

`T_U16 infractionsCount`

Number of elements in the infractions array.
[More...](#)

`ApexInfraction * infractionsArray`

Array of available infractions. [More...](#)

Detailed Description

Infractions array.

Note

API-APEX takes full responsibility with allocating and freeing the space required for the infractions array.

Field Documentation

◆ **infractionsArray**

ApexInfraction* infractionsArray

Array of available infractions.

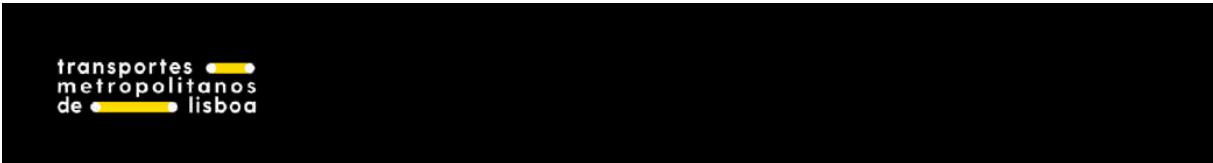
◆ **infractionsCount**

T_U16 infractionsCount

Number of elements in the infractions array.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-



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ApexInitParameters Struct Reference

Apex initialization parameters. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **operatorId**
[K_APEX_OPERATOR_ID_MAX_SIZE]
Operator identifier. This ID must match one defined in the Technical Parameters configuration file. [More...](#)

T_U16 **machineCode**
Identifier of the machine running APEX.
[More...](#)

T_S8 **channelId**
[K_APEX_CHANNEL_ID_MAX_SIZE]
Channel identifier. This ID must match one defined in the commercial offer configuration file. [More...](#)

T_S8 **deviceId**
[K_APEX_DEVICE_ID_MAX_SIZE]
Device point of sale identifier. [More...](#)

ApexUtilizationMode utilizationMode

The utilization mode influences the type of validations performed. [More...](#)

T_S8 **numDailyFilePath**
[K_APEX_FILE_PATH_MAX_SIZE]
Path where the file to manage the operation count is located. [More...](#)

T_U16 **numDailyMinValue**
Minimum value for operations count.
[More...](#)

T_U16 **numDailyMaxValue**
Maximum value for operations count.
[More...](#)

T_S8 **techParamsFullFilename**
[K_APEX_FILE_PATH_MAX_SIZE]
Name and path of the technical parameters configuration file. [More...](#)

T_S8 **networkFullFilename**
[K_APEX_FILE_PATH_MAX_SIZE]
Name and path of the network topology configuration file. [More...](#)

T_S8 **comOfferFullFilename**
[K_APEX_FILE_PATH_MAX_SIZE]
Name and path of the commercial offer configuration file. [More...](#)

T_S8 **actionListsFullFilename**
[K_APEX_FILE_PATH_MAX_SIZE]
Name and path of the action lists configuration file. [More...](#)

Detailed Description

Apex initialization parameters.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



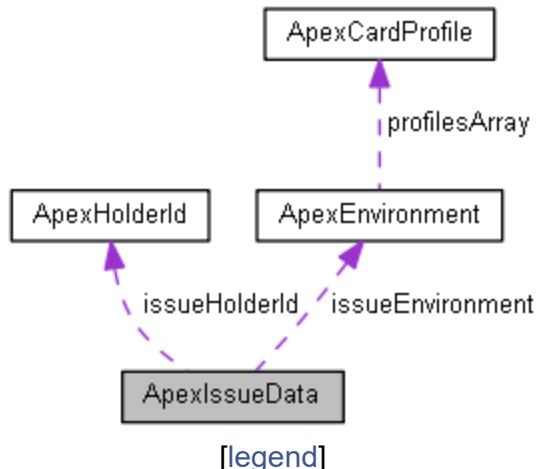
transportes [REDACTED]
metropolitano[s] [REDACTED]
de [REDACTED] lisboa

ApexIssueData Struct Reference

Structure containing the required data for a card issuing. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexIssueData:



Data Fields

ApexIssueMode `issueMode`

Identifies the data structures that will be written/updated during the issue operation.
[More...](#)

ApexEnvironment `issueEnvironment`

Environment data for card issuing. [More...](#)

ApexHolderId issueHolderId

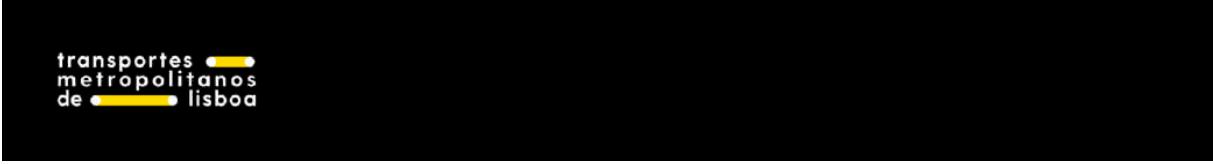
Holder data for card issuing. [More...](#)

Detailed Description

Structure containing the required data for a card issuing.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



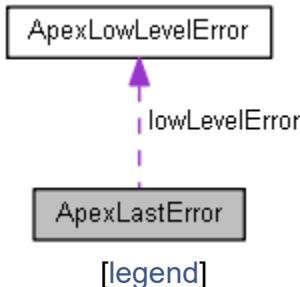
A black rectangular redaction box covers the top portion of the slide content. Inside the box, the text "transportes" followed by a yellow line and two small circles is visible, suggesting a logo or watermark that has been obscured.

ApexLastError Struct Reference

Contains all available information on the last error status. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexLastError:



[legend]

Data Fields

ApexStatus **apexStatus**

Status codes returned by the API-APEX functions. [More...](#)

ApexDetailedStatus **apexDetailedStatus**

Identifies how the low level error structure should be interpreted. [More...](#)

ApexLowLevelError **lowLevelError**

Details information on errors occurring on a lower level than the API-APEX. [More...](#)

Detailed Description

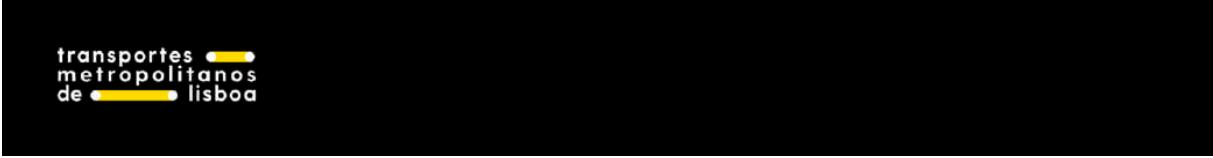
Contains all available information on the last error status.

See also

[ApexGetDetailedStatus](#)

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-

A black rectangular redaction box covering the top portion of the footer area. Inside the box, there is faint, illegible white text that appears to be a logo or watermark.

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Data Fields

ApexLine Struct Reference

Structure that describes a line. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **lineId [K_APEX_LINE_ID_MAX_SIZE]**

Line identifier. [More...](#)

T_S8 **lineName [K_APEX_LINE_NAME_MAX_SIZE]**

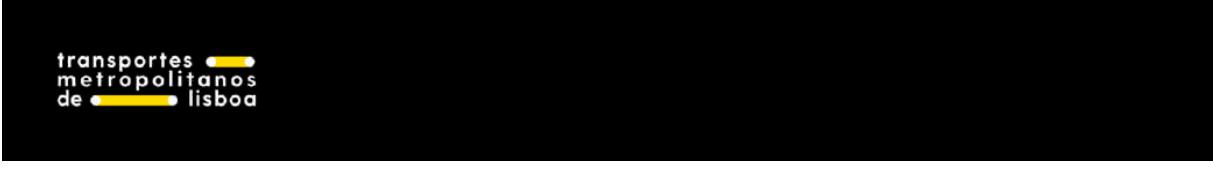
Line name. [More...](#)

Detailed Description

Structure that describes a line.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



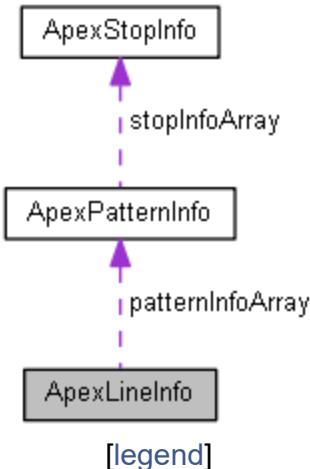
transportes [REDACTED]
metropolitano[s] [REDACTED]
de [REDACTED] lisboa

ApexLineInfo Struct Reference

Information of a line. More...

```
#include <apexGlb.h>
```

Collaboration diagram for ApexLineInfo:



Data Fields

T_S8 **linId [K_APEX_LINE_ID_MAX_SIZE]**
Line identifier. More...

T_S8 **lineName [K_APEX_LINE_NAME_MAX_SIZE]**
Line name. More...

T_U16 **patternInfoCount**

Number of elements in the pattern array.
[More...](#)

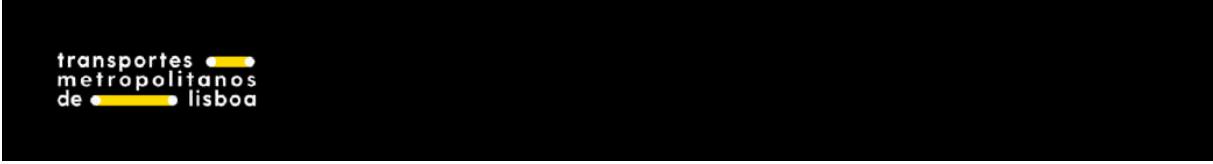
ApexPatternInfo * **patternInfoArray**
Array of line patterns. [More...](#)

Detailed Description

Information of a line.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



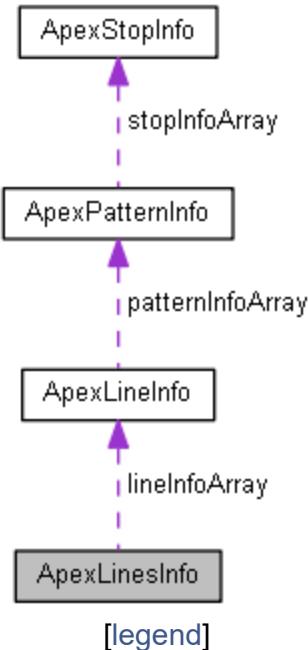
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ApexLinesInfo Struct Reference

Lines Info array. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexLinesInfo:



[legend]

Data Fields

T_U16 **lineInfoCount**

Number of elements in the lines array. [More...](#)

ApexLineInfo * **lineInfoArray**

Array of line. [More...](#)

Detailed Description

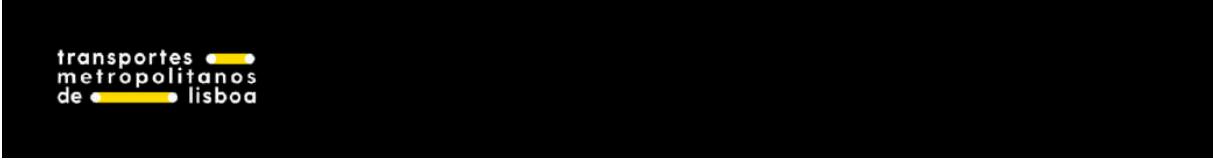
Lines Info array.

Note

API-APEX takes full responsibility with allocating and freeing the space required for the lines array.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-

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Data Fields

ApexLogConfig Struct Reference

Data structure used to configure the logger. [More...](#)

```
#include <apexLog.h>
```

Data Fields

ApexLogType `logType`

Defines the working mode of the logger.
[More...](#)

ApexLogLevel `logLevel`

Defines which message types are logged. [More...](#)

T_S8 `fullFileName`

[`K_APEX_FILE_PATH_MAX_SIZE`]
Path and file name used by the logger.
[More...](#)

F_CB_ExternalLogger `externalLogger`

Logger callback used for an external logger. [More...](#)

Detailed Description

Data structure used to configure the logger.

See also

[ApexSetContext](#)

Field Documentation

◆ externalLogger

F_CB_ExternalLogger externalLogger

Logger callback used for an external logger.

Note

Used when log type is set to
APEX_LOG_TYPE_EXTERNAL_CALLBACK.

◆ fullFileName

T_S8 fullFileName[K_APEX_FILE_PATH_MAX_SIZE]

Path and file name used by the logger.

Note

Used when log type is set to
APEX_LOG_TYPE_INTERNAL_FILE.

◆ logLevel

ApexLogLevel logLevel

Defines which message types are logged.

◆ logType

ApexLogType logType

Defines the working mode of the logger.

The documentation for this struct was generated from the following file:

- **apexLog.h**
-



A large black rectangular redaction box covers the top portion of the page content. Within this redacted area, there is a small, partially visible white logo consisting of the words "transportes metropolitanos de lisboa" in a sans-serif font, with a yellow horizontal bar graphic above the word "lisboa".



Data Fields

ApexLowLevelError Struct Reference

Details information on errors occurring on a lower level than the API-APEX. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

ApexLowLevelErrorType **errorType**

Identifies how the low level error structure should be interpreted. [More...](#)

T_U32 **status1**

Represents a status or error depending on the value of errorType.
[More...](#)

T_U32 **status2**

Represents a status or error depending on the value of errorType.
[More...](#)

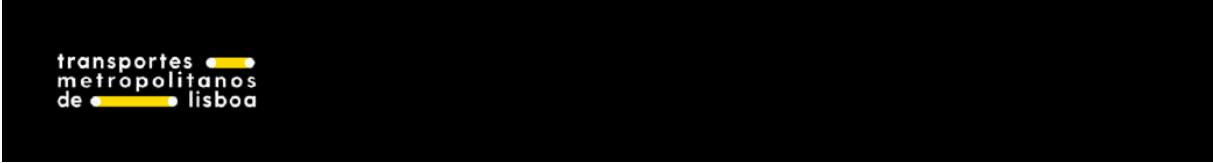
Detailed Description

Details information on errors occurring on a lower level than the API-APEX.

API-APEX makes various calls to other modules whose error status and details should not be lost with the API-APEX own errors. The **ApexLowLevelError** exists then to safekeep these errors so that they can be fetched when necessary.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



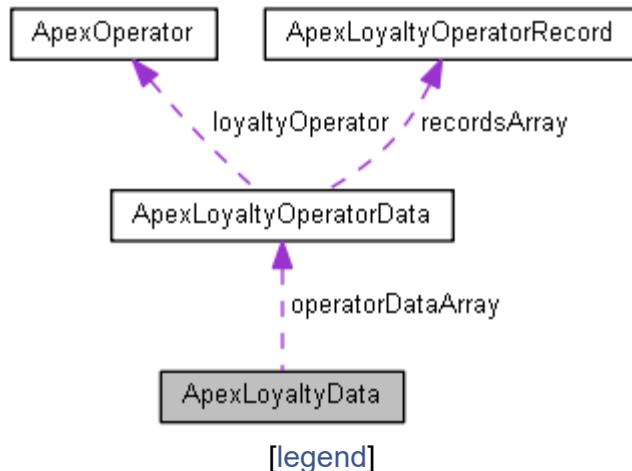
A large black rectangular redaction box covers the top portion of the page content. Within this redacted area, there is a small, partially visible logo consisting of the text "transportes" followed by a yellow graphic element (two dots connected by a line) and the word "lisboa". Below this, the word "de" is followed by another yellow graphic element and a dot.

ApexLoyaltyData Struct Reference

Loyalty data structure. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexLoyaltyData:



[legend]

Data Fields

`T_U16 loyaltyDataNumber`
Loyalty data number. [More...](#)

`T_U16 operatorDataCount`
Number of elements in the operator data array. [More...](#)

`ApexLoyaltyOperatorData * operatordataArray`

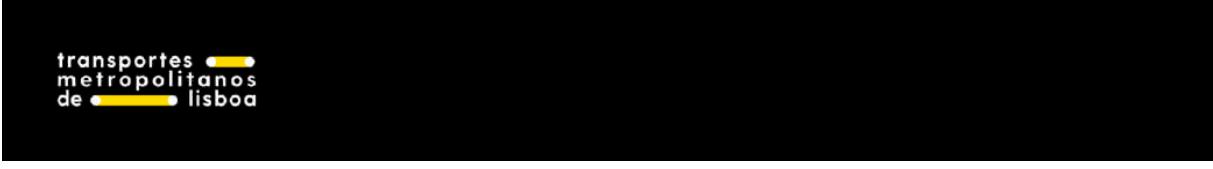
Operator specific loyalty data
(dynamically allocated). [More...](#)

Detailed Description

Loyalty data structure.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



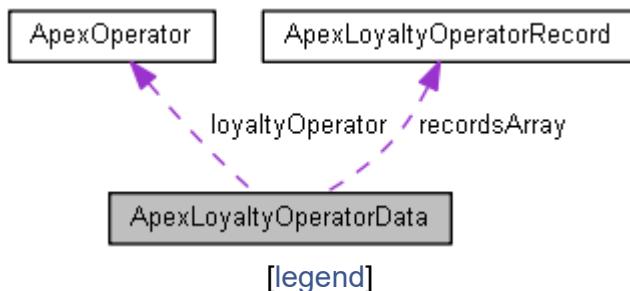
A black rectangular redaction box covers the top portion of the slide content. Inside the box, the text "transportes" followed by a yellow bar with a dot, "metropolitano" followed by a yellow bar with a dot, "de" followed by a yellow bar with a dot, and "lisboa" followed by a yellow bar with a dot is visible.

ApexLoyaltyOperator Data Struct Reference

Operator specific loyalty data structure. More...

```
#include <apexGlb.h>
```

Collaboration diagram for ApexLoyaltyOperatorData:



Data Fields

ApexOperator **loyaltyOperator**
Loyalty operator. More...

T_U8 **clientLevel**
Loyalty level of the client. More...

T_U16 **recordsCount**
Number of elements in the records array (1..4). More...

ApexLoyaltyOperatorRecord * **recordsArray**
Array of operator records

(dynamically allocated). More...

Detailed Description

Operator specific loyalty data structure.

The documentation for this struct was generated from the following file:

- **apexGlb.h**
-



transportes [REDACTED]
metropolitano[REDACTED]
de [REDACTED] lisboa



Data Fields

ApexLoyaltyOperator Record Struct Reference

Loyalty data record structure. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_U32 **value**

Value of the loyalty counter. [More...](#)

T_UtilDate **startDate**

Start date of the loyalty data. [More...](#)

T_UtilDate **endDate**

End date of the loyalty data. [More...](#)

T_UtilDate **loadEndDate**

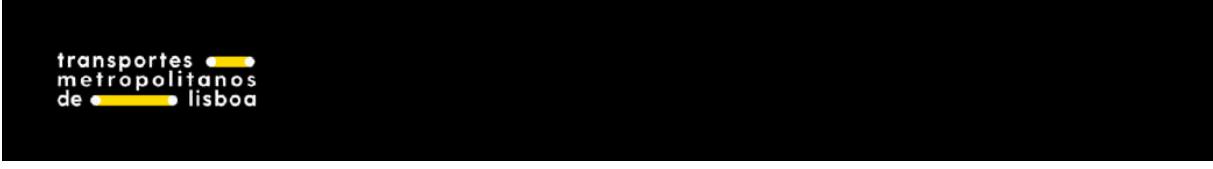
Last valid day for the increase of the loyalty counter.
[More...](#)

Detailed Description

Loyalty data record structure.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



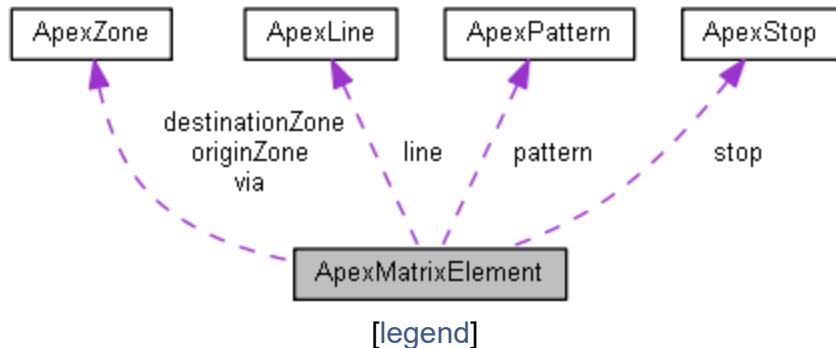
A black rectangular redaction box covers the top portion of the slide content. Inside the box, there is a small, partially visible logo consisting of the words "transportes metropolitanos de lisboa" in white, sans-serif font, with a yellow horizontal bar graphic above the word "lisboa".

ApexMatrixElement Struct Reference

Matrix selection element. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexMatrixElement:



[legend]

Data Fields

ApexZone originZone
Origin zone. [More...](#)

ApexZone destinationZone
Destination zone. [More...](#)

ApexLine line
Line. [More...](#)

ApexPattern pattern
Pattern. [More...](#)

ApexStop stop

Stop. More...

ApexZone via

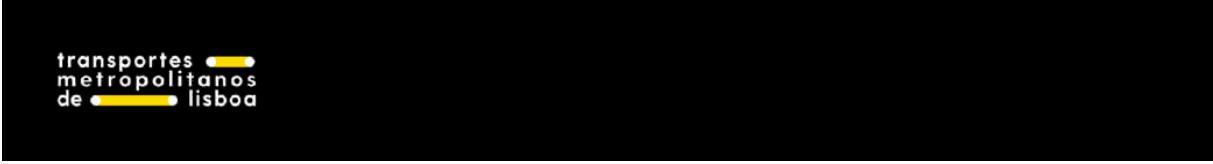
Via zone. More...

Detailed Description

Matrix selection element.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexOperator Struct Reference

Structure that describes an operator. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **operatorId [K_APEX_OPERATOR_ID_MAX_SIZE]**
Operator identifier. [More...](#)

T_S8 **operatorName [K_APEX_OPERATOR_NAME_MAX_SIZE]**
Operator name. [More...](#)

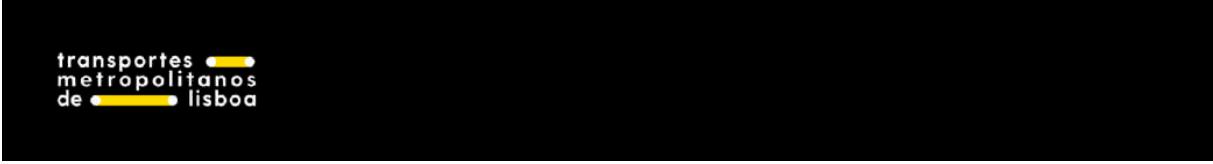
T_S8 **operatorShortName
[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE]**
Operator short name. [More...](#)

Detailed Description

Structure that describes an operator.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



transportes [REDACTED]
metropolitano[s] [REDACTED]
de [REDACTED] lisboa



Data Fields

ApexOperatorConfig Struct Reference

Apex operator configuration parameters. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **operatorId**
[K_APEX_OPERATOR_ID_MAX_SIZE]
Operator identifier. This ID must match one defined in the Technical Parameters configuration file. [More...](#)

T_U16 **machineCode**
Identifier of the machine running APEX.
[More...](#)

T_S8 **channelId**
[K_APEX_CHANNEL_ID_MAX_SIZE]
Channel identifier. This ID must match one defined in the commercial offer configuration file. [More...](#)

T_S8 **deviceId**
[K_APEX_DEVICE_ID_MAX_SIZE]
Device point of sale identifier. [More...](#)

ApexUtilizationMode utilizationMode

The utilization mode influences the type of validations performed. [More...](#)

T_S8 **numDailyFilePath**

[**K_APEX_FILE_PATH_MAX_SIZE**]

Path where the file to manage the operation count is located. [More...](#)

T_U16 **numDailyMinValue**

Minimum value for operations count.

[More...](#)

T_U16 **numDailyMaxValue**

Maximum value for operations count.

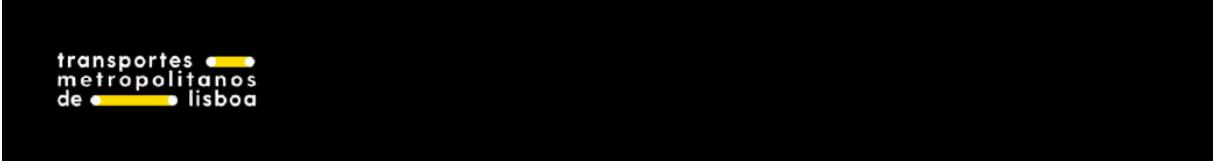
[More...](#)

Detailed Description

Apex operator configuration parameters.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexPaperSaleAckParameters Struct Reference

Input parameters of the [ApexPaperSaleAck\(\)](#) function. [More...](#)

```
#include <apex.h>
```

Data Fields

T_S8 **ticketNumber** [[K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE](#)]
Ticket number. [More...](#)

T_S8 **securityData** [[K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE](#)]
Paper ticket security content. [More...](#)

Detailed Description

Input parameters of the **ApexPaperSaleAck()** function.

Field Documentation

◆ securityData

T_S8 securityData[K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE]

Paper ticket security content.

Used in conjunction with
ApexPaperSaleAckMode.APEX_PAPER_SALE_ACK_MODE_TICKET_DATA_READ
to validate a paper ticket.

◆ ticketNumber

T_S8 ticketNumber[K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE]

Ticket number.

Used in conjunction with
ApexPaperSaleAckMode.APEX_PAPER_SALE_ACK_MODE_MANUAL_INPUT to
validate a paper ticket.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-





Data Fields

ApexPaperTicketData Struct Reference

Data to be printed on the onboard ticket. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8	ticketNumber [K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE]
------	--

Ticket number. [More...](#)

T_UtilDateTime	saleDate Sale date. More...
----------------	---

T_UtilDateTime	expirationDate Expiration date. More...
----------------	---

T_S32	price Ticket price. More...
-------	---

T_S32	taxPercentage Value in percentage of the applied tax rate. More...
-------	--

T_S8	operatorName [K_APEX_OPERATOR_NAME_MAX_SIZE] Operator name. More...
------	---

T_S8	operatorShortName [K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE] Operator short name. More...
------	---

T_S8	lineName [K_APEX_LINE_NAME_MAX_SIZE]
------	---

Line name. [More...](#)

T_S8 **patternName** [[K_APEX_PATTERN_NAME_MAX_SIZE](#)]
Pattern name. [More...](#)

T_S8 **stopName** [[K_APEX_STOP_NAME_MAX_SIZE](#)]
Stop name. [More...](#)

T_S8 **securityData**
[[K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE](#)]
Paper ticket security content. This content is used as input
for the paper ticket control operation. [More...](#)

Detailed Description

Data to be printed on the onboard ticket.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



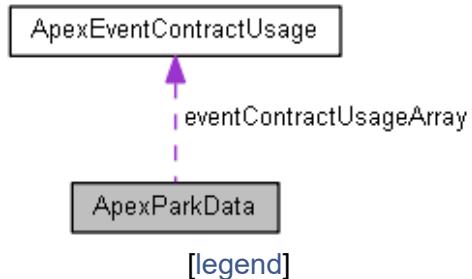
A large black rectangular redaction box covers the top portion of the page content. In the upper-left corner of this redacted area, there is a small white text label that reads "transportes" followed by three yellow dots, "metropolitano" followed by two yellow dots, "de" followed by one yellow dot, and "lisboa" followed by one yellow dot. This appears to be a placeholder for a logo or brand name that has been removed for security or copyright reasons.

ApexParkData Struct Reference

Apex Parking Data structure based on Viva v2 data model structure.
[More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexParkData:



Data Fields

T_UtilDateTime **eventDateTime**

Date and time of the event. [More...](#)

T_VivaEventType **eventType**

Type of the event. [More...](#)

T_UtilDate **exitDateLimit**

Date limit for the exit. [More...](#)

T_UtilTime **exitTimeLimit**

Time limit for the exit. [More...](#)

T_S8 **eventOperatorId**
[K_APEX_OPERATOR_ID_MAX_SIZE]
Event operator identifier. [More...](#)

T_S8 **networkId**
[K_APEX_NETWORK_ID_MAX_SIZE]
Network where the event occurred.
[More...](#)

T_U16 **locationId**
Location identifier. [More...](#)

T_U16 **contractsUsedMask**
Mask with the contracts used in the validation. [More...](#)

T_U8 **profilesUsedMask**
Mask with the profiles used in the validation. [More...](#)

T_U32 **deviceId**
Device identifier. [More...](#)

T_U16 **priceAmount**
Amount of the event. [More...](#)

T_U16 **eventContractUsageCount**
Number of elements in the event contract usage array. [More...](#)

ApexEventContractUsage * **eventContractUsageArray**
Event contract usage data structure (dynamically allocated). [More...](#)

Detailed Description

Apex Parking Data structure based on Viva v2 data model structure.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexPattern Struct Reference

Structure that describes a run. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **patternId [K_APEX_PATTERN_ID_MAX_SIZE]**
Pattern identifier. [More...](#)

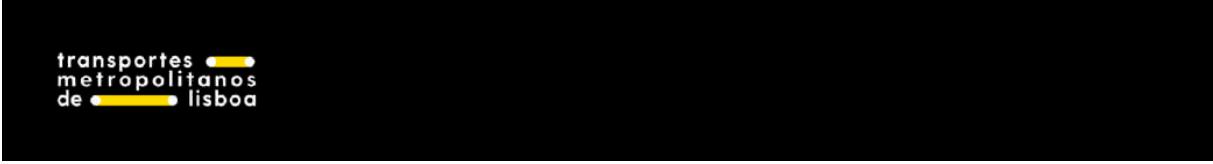
T_S8 **patternName [K_APEX_PATTERN_NAME_MAX_SIZE]**
Pattern name. [More...](#)

Detailed Description

Structure that describes a run.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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metropolitano[s] [REDACTED]
de [REDACTED] lisboa

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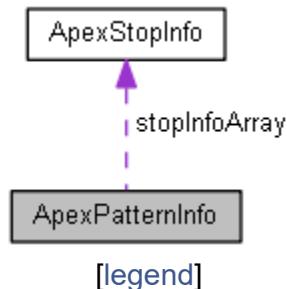
Data Fields

ApexPatternInfo Struct Reference

Information of a pattern. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexPatternInfo:



Data Fields

T_S8 **patternId** [[K_APEX_PATTERN_ID_MAX_SIZE](#)]
Line identifier. [More...](#)

T_S8 **patternName**
[[K_APEX_PATTERN_NAME_MAX_SIZE](#)]
Line name. [More...](#)

T_U16 **stopInfoCount**
Number of elements in the stops array. [More...](#)

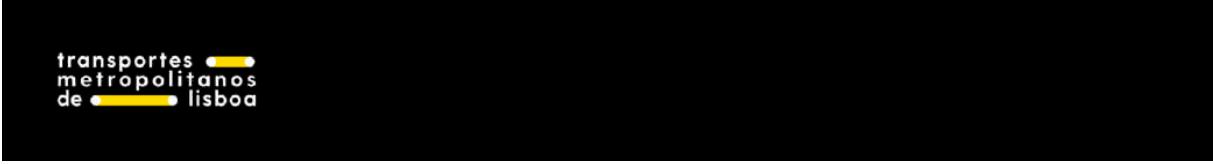
ApexStopInfo * **stopInfoArray**
Array of pattern stops. [More...](#)

Detailed Description

Information of a pattern.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexPaymentInfo Struct Reference

Payment information. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

ApexPaymentMethod paymentMethod

Payment method used during a product sale. [More...](#)

T_S8 **vatNumber**

[**K_APEX_VAT_NUMBER_MAX_SIZE**]
VAT number. [More...](#)

T_S8 **invoiceNumber**

[**K_APEX_INVOICE_NUMBER_MAX_SIZE**]
Invoice number. [More...](#)

Detailed Description

Payment information.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexPerformanceConfig Struct Reference

Performance configuration. [More...](#)

```
#include <apex.h>
```

Data Fields

T_U32 **capacity**

Capacity of the record array (allocated memory). [More...](#)

T_U8 **autoIncreaseFlag**

Indicates if the performance record array can be increased automatically. [More...](#)

T_S8 **fullFileName [K_APEX_FILE_PATH_MAX_SIZE]**

Indicates the filename path to save the performance data. [More...](#)

Detailed Description

Performance configuration.

Field Documentation

◆ autoIncreaseFlag

T_U8 autoIncreaseFlag

Indicates if the performance record array can be increased automatically.

◆ capacity

T_U32 capacity

Capacity of the record array (allocated memory).

◆ fullFileName

T_S8 fullFileName[K_APEX_FILE_PATH_MAX_SIZE]

Indicates the filename path to save the performance data.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-

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Data Fields

ApexPhysicalSupport Struct Reference

Details of the physical card required to complete the transport product sale. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **productId** [**K_APEX_PRODUCT_ID_MAX_SIZE**]
Physical support product identifier. [More...](#)

T_S8 **productName** [**K_APEX_PRODUCT_NAME_MAX_SIZE**]
Physical support name. [More...](#)

T_S8 **salesPackageId**
[**K_APEX_SALES_PACKAGE_ID_MAX_SIZE**]
Identifier of the sales package that will be used in the physical support sale. [More...](#)

T_S32 **price**
Price in cents of the physical support. [More...](#)

T_S32 **taxPercentage**
Value in percentage of the applied tax rate. [More...](#)

T_S32 **taxValue**

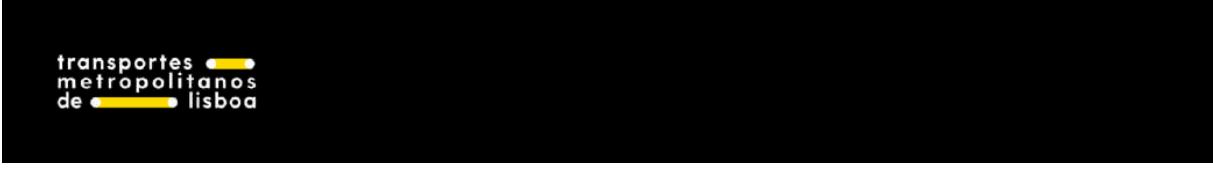
Value in cents of the tax. More...

Detailed Description

Details of the physical card required to complete the transport product sale.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



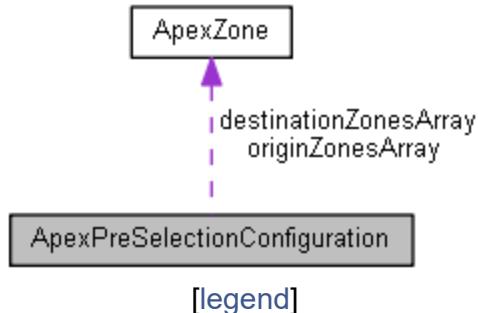
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de [REDACTED] lisboa

ApexPreSelectionCo nfiguration Struct Reference

Pre-selection configuration data. More...

```
#include <apexGlb.h>
```

Collaboration diagram for ApexPreSelectionConfiguration:



Data Fields

T_S8 **configurationId**

[K_APEX_CONFIGURATION_ID_MAX_SIZE]

Used to identify the Pre-Selection configuration during **ApexPreSelection()**. More...

T_U8 **isValid**

Informs whether the current configuration is valid or not. Only a valid configuration will be accepted by

ApexPreSelection(). More...

T_U8 **isODPreSelectionFlag**

Informs whether the current configuration requires a

selection of the Origin and Destination zones.
[More...](#)

T_U16 **originZoneSelectedIndex**
Selected origin zone index. [More...](#)

T_U16 **originZonesCount**
Number of elements of the originZonesArray. [More...](#)

ApexZone * **originZonesArray**
Array containing all available origin zones. [More...](#)

T_U16 **destinationZoneSelectedIndex**
Selected destination zone index. [More...](#)

T_U16 **destinationZonesCount**
Number of elements of the destinationZonesArray.
[More...](#)

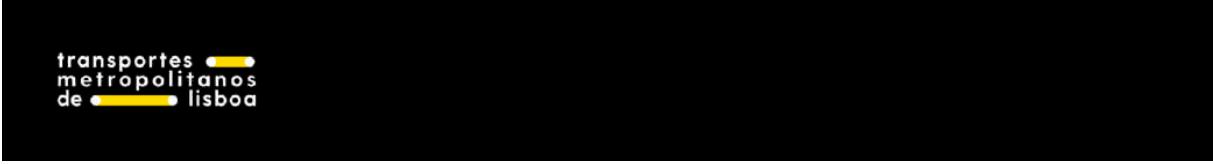
ApexZone * **destinationZonesArray**
Array containing all available destination zones for
the currently selected origin zone. [More...](#)

Detailed Description

Pre-selection configuration data.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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de [REDACTED] lisboa



Data Fields

ApexPreSelectionParameters Struct Reference

Pre-selection confirmation parameters. [More...](#)

```
#include <apex.h>
```

Data Fields

T_S8	configurationId [K_APEX_CONFIGURATION_ID_MAX_SIZE] Pre-Selection configuration identifier. More...
------	---

ApexPreSelectionMode	preSelectionMode Defines where the pre-selection data is written. More...
-----------------------------	---

Detailed Description

Pre-selection confirmation parameters.

Field Documentation

◆ configurationId

T_S8 configurationId[K_APEX_CONFIGURATION_ID_MAX_SIZE]

Pre-Selection configuration identifier.

◆ preSelectionMode

ApexPreSelectionMode preSelectionMode

Defines where the pre-selection data is written.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-





Data Fields

ApexProductCategory Struct Reference

Product Category. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_U16 **level**

Arbitrary level. [More...](#)

T_S8 **description**

[K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE]

Description of the product category. [More...](#)

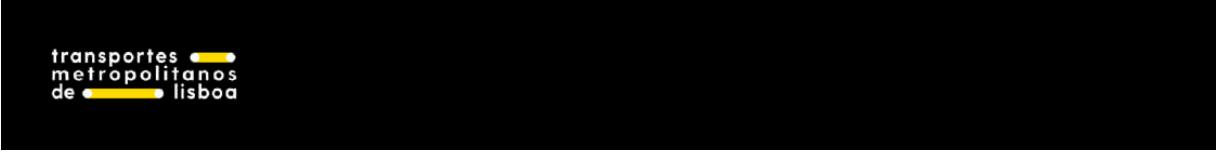
Detailed Description

Product Category.

A product category represents a classification of the product used in order to help in the grouping and searching of similar products.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



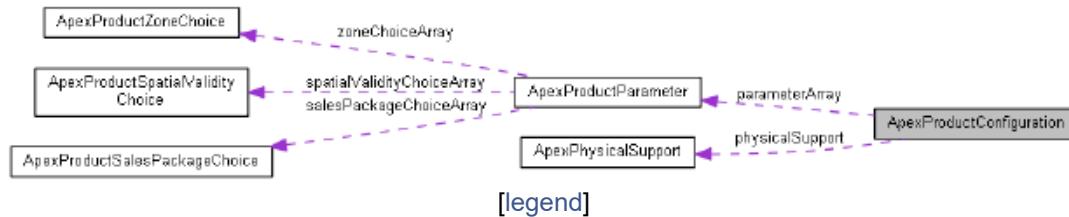
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ApexProductConfiguration Struct Reference

Represents a product configuration. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexProductConfiguration:



Data Fields

T_S8 configurationId
[K_APEX_CONFIGURATION_ID_MAX_SIZE]
Used to identify the product configuration during **ApexLoad()** or **ApexTransfer()**.
[More...](#)

ApexConfigureProductStatus status
Contains the status of the current product configuration. [More...](#)

T_S32 price
Total amount to be requested to the customer in cents. [More...](#)

T_U8 parameterCount
Number of configuration parameters in the parameter array. [More...](#)

ApexProductParameter * parameterArray

Parameters available for configuration.
[More...](#)

T_U8 [hasPhysicalSupport](#)

Defines whether the product sale/load requires the sale of a physical support.
[More...](#)

[ApexPhysicalSupport](#) [physicalSupport](#)

Details of the physical support sale. [More...](#)

Detailed Description

Represents a product configuration.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



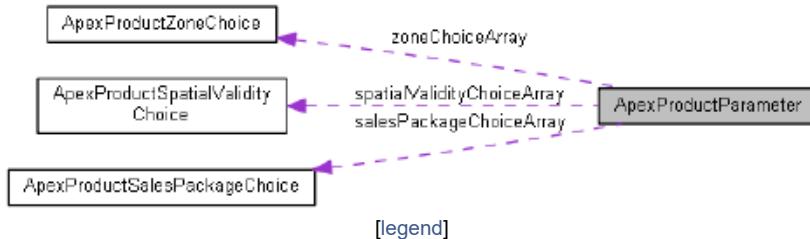
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ApexProductParameter Struct Reference

Product parameter to be configured. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexProductParameter:



Data Fields

`ApexProductParamType` `type`

Identifier of the parameter. [More...](#)

`T_U32` `numValue`

Numeric value configuration for the parameter. [More...](#)

`T_U64` `numValue64`

64-bit numeric value configuration for the parameter.
[More...](#)

`T_UtilDateTime` `dateTimeValue`

Date and time value configuration for the parameter.
[More...](#)

`T_S8` `textValue`

`[K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_SIZE]`
Text value configuration for the parameter. [More...](#)

`T_S8` `configId` `[K_APEX_GENERIC_ID_MAX_SIZE]`

Internal APEX reference identifier. [More...](#)

`T_U16` `zoneChoiceNumberOfSelections`

Number of elements in the zone choice array that must be selected. [More...](#)

`T_U16` `zoneChoiceCount`

Number of elements in the zone choice array. [More...](#)

ApexProductZoneChoice * **zoneChoiceArray**

Available zones for configuration. [More...](#)

T_U16 **spatialValidityChoiceCount**

Number of elements in the spatial validity choice array.

[More...](#)

ApexProductSpatialValidityChoice * **spatialValidityChoiceArray**

Available spatial validity elements for configuration. [More...](#)

T_U16 **salesPackageChoiceCount**

Number of elements in the sales package choice array.

[More...](#)

ApexProductSalesPackageChoice * **salesPackageChoiceArray**

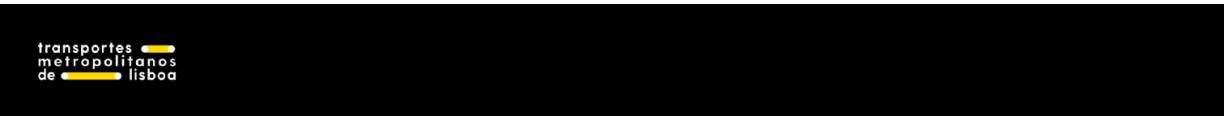
Available sales packages for configuration. [More...](#)

Detailed Description

Product parameter to be configured.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexProductSalesPackage Struct Reference

Sales package of a product. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **salesPackageId**
[K_APEX_SALES_PACKAGE_ID_MAX_SIZE]
Identifier of the sales package. [More...](#)

T_U8 **groupDimension**
Group dimension. [More...](#)

T_U16 **unitsNumber**
Number of units. [More...](#)

T_S32 **price**
Price in cents of the sales package. [More...](#)

T_S32 **taxPercentage**
Value in percentage of the applied tax rate. [More...](#)

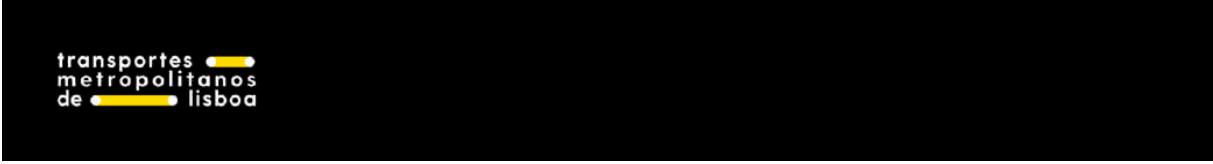
T_S32 **taxValue**
Value in cents of the tax. [More...](#)

Detailed Description

Sales package of a product.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexProductSalesPackageChoice Struct Reference

Represents a choice available for a sales package selection. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **salesPackageId**
[K_APEX_SALES_PACKAGE_ID_MAX_SIZE]
Identifier of the sales package. [More...](#)

T_U8 **isSelectedFlag**
Indicates whether this element has been selected as the loading configuration choice. [More...](#)

T_U8 **groupDimension**
Group dimension. [More...](#)

T_U16 **unitsNumber**
Number of units. [More...](#)

T_S32 **price**
Price in cents of the sales package. [More...](#)

T_S32 **taxPercentage**
Value in percentage of the applied tax rate. [More...](#)

T_S32 **taxValue**

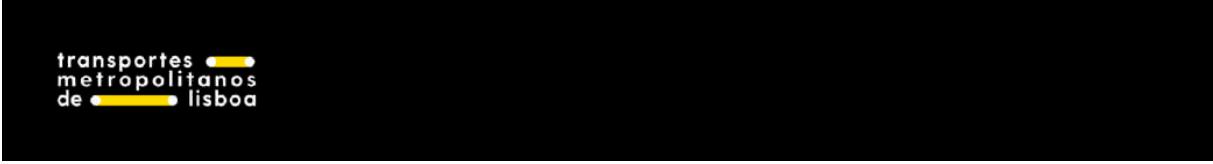
Value in cents of the tax. More...

Detailed Description

Represents a choice available for a sales package selection.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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ApexProductSpatialValidityChoice Struct Reference

Represents a choice available for a spatial validity selection. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **spatialValidityId** [[K_APEX_GENERIC_ID_MAX_SIZE](#)]

Identifier of the spatial validity. [More...](#)

T_U8 **isSelectedFlag**

Indicates whether this element has been selected as the loading configuration choice. [More...](#)

T_S8 **lineName** [[K_APEX_LINE_NAME_MAX_SIZE](#)]

Line name. [More...](#)

T_S8 **originZoneName** [[K_APEX_ZONE_NAME_MAX_SIZE](#)]

Origin zone name. [More...](#)

T_S8 **destinationZoneName**

[[K_APEX_ZONE_NAME_MAX_SIZE](#)]

Destination zone name. [More...](#)

T_S8 **viaZoneName** [[K_APEX_ZONE_NAME_MAX_SIZE](#)]

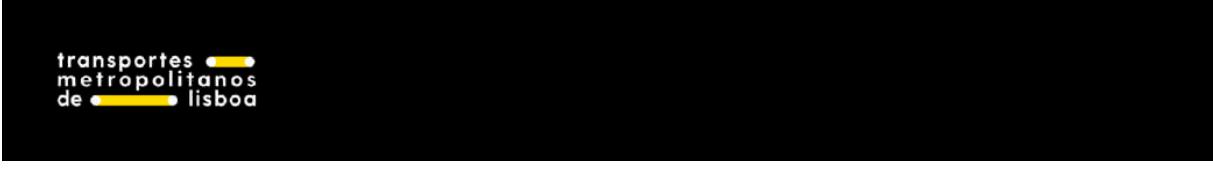
Via zone name. [More...](#)

Detailed Description

Represents a choice available for a spatial validity selection.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexProductZoneChoice Struct Reference

Represents a choice available for a zone selection. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **zonId [K_APEX_ZONE_ID_MAX_SIZE]**

Identifier of the zone. [More...](#)

T_U8 **isSelectedFlag**

Indicates whether this element has been selected as one of the loading configuration choices. [More...](#)

T_S8 **zoneName [K_APEX_ZONE_NAME_MAX_SIZE]**

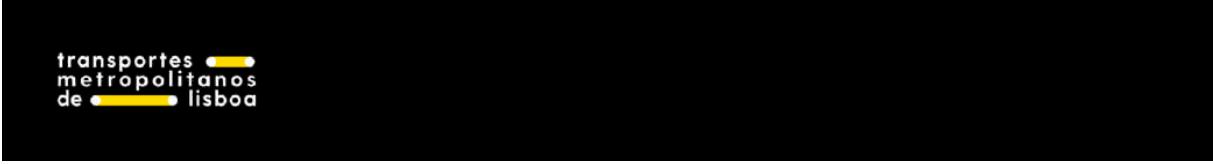
Zone name. [More...](#)

Detailed Description

Represents a choice available for a zone selection.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexProfile Struct Reference

Data structure containing the data that defines a profile. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **profileId [K_APEX_PROFILE_ID_MAX_SIZE]**
Profile identifier. [More...](#)

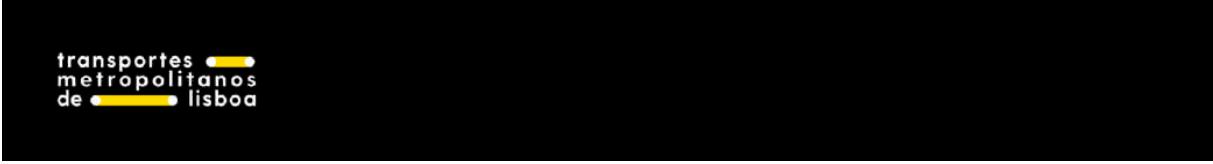
T_S8 **profileName [K_APEX_PROFILE_NAME_MAX_SIZE]**
Profile name. [More...](#)

Detailed Description

Data structure containing the data that defines a profile.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



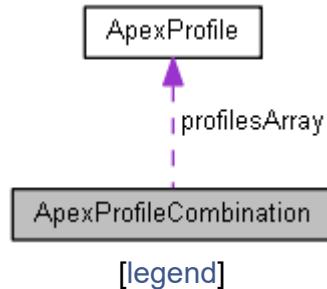
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ApexProfileCombination Struct Reference

Represents a profile combination. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexProfileCombination:



[legend]

Data Fields

T_U16 **profilesCount**

Number of elements in the profiles array. [More...](#)

ApexProfile * **profilesArray**

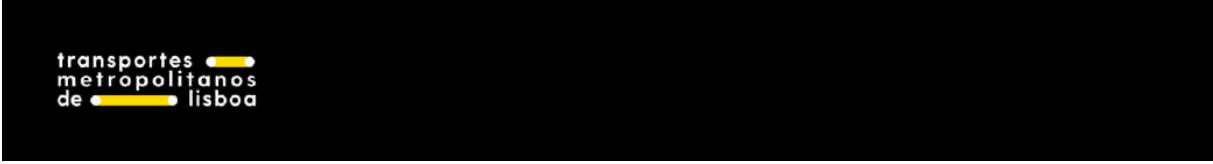
Array of profiles. [More...](#)

Detailed Description

Represents a profile combination.

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- [apexGlb.h](#)
-



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Data Fields

ApexReadCardInput Parameters Struct Reference

Structure containing all parameters required to run a card read operation. [More...](#)

```
#include <apex.h>
```

Data Fields

T_U8 **readHolderIdFlag**

Flag that defines whether **ApexRead()** should read the holder id or not. [More...](#)

T_U8 **readLoyaltyDataFlag**

Flag that defines whether **ApexRead()** should read the loyalty data or not. [More...](#)

T_U8 **readParkDataFlag**

Flag that defines whether **ApexRead()** should read the park data or not. [More...](#)

Detailed Description

Structure containing all parameters required to run a card read operation.

See also

[ApexReadCard](#)

Field Documentation

◆ **readHolderIdFlag**

T_U8 readHolderIdFlag

Flag that defines whether **ApexRead()** should read the holder id or not.

Note

If set to FALSE, `outCardOutputData.cardData.holderId` will be set to 0's.

If set to TRUE, API-APEX will attempt to read the holder id using the default pin code for the current card type specified in the technical parameters configuration file.

◆ **readLoyaltyDataFlag**

T_U8 readLoyaltyDataFlag

Flag that defines whether **ApexRead()** should read the loyalty data or not.

Note

If set to FALSE,
`outCardOutputData.cardDataExtra.loyaltyRecordsArray` will be empty.

◆ **readParkDataFlag**

T_U8 **readParkDataFlag**

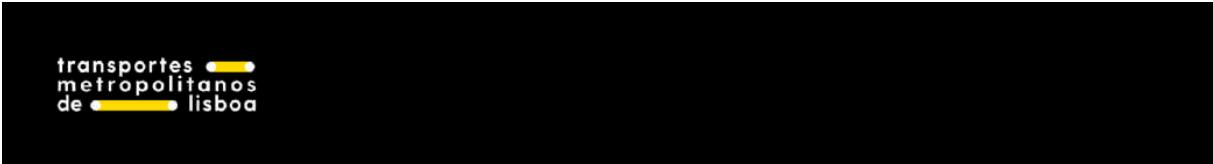
Flag that defines whether **ApexRead()** should read the park data or not.

Note

If set to FALSE, `outCardOutputData.cardDataExtra.parkData` will be empty.

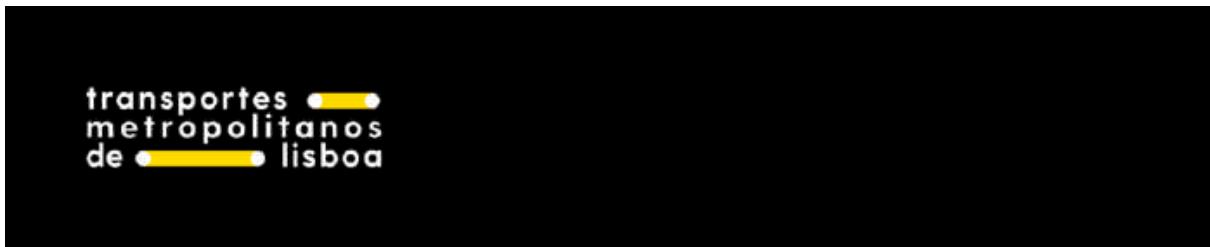
The documentation for this struct was generated from the following file:

- [apex.h](#)
-



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A large black rectangular redaction box covers the top right portion of the slide. Inside this box, there is a small white text area containing the words "transportes", "metropolitano", "de", and "lisboa", which are likely parts of a logo that has been obscured.



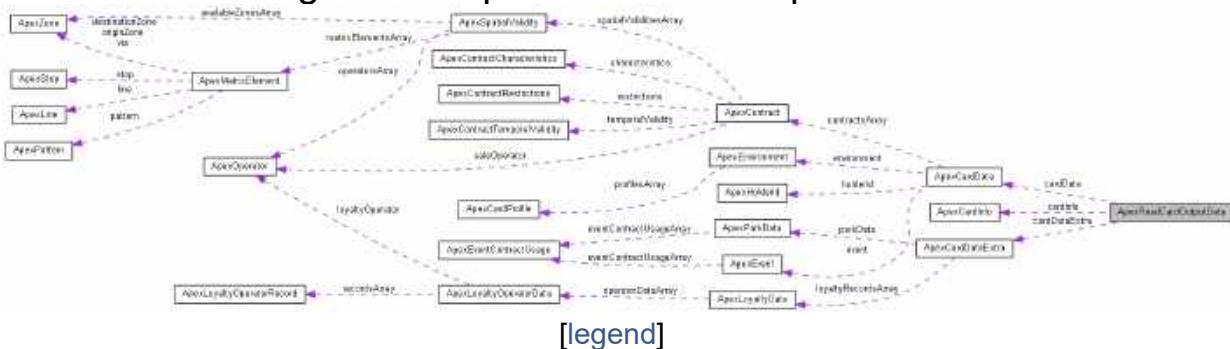
ApexReadCardOutputData Struct Reference

Data Fields

Structure containing all data read from a card. [More...](#)

```
#include <apex.h>
```

Collaboration diagram for ApexReadCardOutputData:



Data Fields

ApexCardInfo cardInfo

Card information and details. [More...](#)

T_U8 cardInBlacklistFlag

Indicates whether or not the card is in the blacklist. [More...](#)

T_U8 samInBlacklistFlag

Indicates whether or not the personalization SAM is in the blacklist. [More...](#)

T_U8 contractsInGreenlistFlag

Indicates whether or not the card has greenlist contracts waiting to be loaded.

[More...](#)

ApexCardData cardData

Contains the card data structures. [More...](#)

ApexCardDataExtra cardDataExtra

Contains the card loyalty and park data structures. [More...](#)

Detailed Description

Structure containing all data read from a card.

See also

[ApexReadCard](#)

Field Documentation

◆ cardData

ApexCardData cardData

Contains the card data structures.

◆ cardDataExtra

ApexCardDataExtra cardDataExtra

Contains the card loyalty and park data structures.

◆ cardInBlacklistFlag

T_U8 cardInBlacklistFlag

Indicates whether or not the card is in the blacklist.

The card is present in the blacklist if this value is set to TRUE (1) and not present if set to FALSE (0).

◆ cardInfo

ApexCardInfo cardInfo

Card information and details.

◆ contractsInGreenlistFlag

T_U8 contractsInGreenlistFlag

Indicates whether or not the card has greenlist contracts waiting to be loaded.

The card has at least one valid contract present in the greenlist if this value is set to TRUE (1) and no valid contracts if set to FALSE (0).

Only used if the current greenlist behaviour is set to APEX_GREENLIST_BEHAVIOR_INFO.

◆ samInBlacklistFlag

T_U8 samInBlacklistFlag

Indicates whether or not the personalization SAM is in the blacklist.

The SAM is present in the blacklist if this value is set to TRUE (1) and not present if set to FALSE (0).

The documentation for this struct was generated from the following file:

- [apex.h](#)

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Data Fields

ApexReadTransferParameters Struct Reference

Structure containing the required parameters to perform a contract transferral from a card. [More...](#)

```
#include <apex.h>
```

Data Fields

T_U16 **contractCount**

Number of contracts to be transferred. [More...](#)

T_U8 **contractNumber [K_APEX_CONTRACTS_MAX_SIZE]**

Identifies the contract number from the origin card (starting from 1) to be transferred. [More...](#)

Detailed Description

Structure containing the required parameters to perform a contract transferral from a card.

Field Documentation

◆ contractCount

T_U16 contractCount

Number of contracts to be transferred.

◆ contractNumber

T_U8 contractNumber[K_APEX_CONTRACTS_MAX_SIZE]

Identifies the contract number from the origin card (starting from 1) to be transferred.

Always mandatory.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-



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Data Fields

ApexSamReaderConfig Struct Reference

Data structure containing the required info to initialize a SAM reader.

[More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_U8 **id**

Arbitrary ID of the SAM reader. [More...](#)

T_S8 **samTypeld**

[K_APEX_SAM_TYPE_ID_MAX_SIZE]

Identifier of the SAM type. This ID must match one defined in the technical parameters file. [More...](#)

T_CscType **cscType**

Reader CSC/Coupler type. [More...](#)

T_S8 **readerAddress**

[K_APEX_READER_ADDRESS_MAX_SIZE]

SAM reader address. [More...](#)

T_U8 **slotNumber**

SAM slot number. [More...](#)

T_U16 **samAttrLen**

ATR length of the SAM. [More...](#)

T_U8 [samAttr](#) [K_ATR_MAX_LENGTH]
ATR returned by the card security
module(SAM). [More...](#)

T_CouplerConfiguration * [couplerConfiguration](#)
Pointer to the structure with the Coupler
Configuration. [More...](#)

Detailed Description

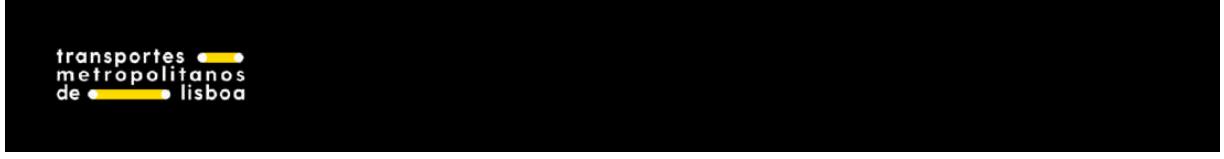
Data structure containing the required info to initialize a SAM reader.

See also

[ApexAddSamReader](#)

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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ApexServiceLocation Struct Reference

Service location context. [More...](#)

```
#include <apex.h>
```

Data Fields

T_S8 **operationPlanId** [K_APEX_OPERATION_PLAN_ID_MAX_SIZE]
Operation plan identifier. [More...](#)

T_S8 **blockId** [K_APEX_BLOCK_ID_MAX_SIZE]
Vehicle block identifier. [More...](#)

T_U32 **vehicleId**
Vehicle identifier. This value will be written on the card's event. [More...](#)

T_S8 **dutyId** [K_APEX_DUTY_ID_MAX_SIZE]
Driver duty identifier. [More...](#)

T_S8 **journeyId** [K_APEX_JOURNEY_ID_MAX_SIZE]
Journey identifier. [More...](#)

T_S8 **extraJourneyId** [K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE]
Extra Journey identifier. [More...](#)

T_S8 **lineId** [K_APEX_LINE_ID_MAX_SIZE]
Line identifier. [More...](#)

T_S8 **patternId** [K_APEX_PATTERN_ID_MAX_SIZE]
Pattern identifier. [More...](#)

T_S8 **stopId** [K_APEX_STOP_ID_MAX_SIZE]
Stop identifier. [More...](#)

ApexOutOfBoundsType **outOfBoundsType**
Identifies the activation type of the out of bounds validation. [More...](#)

Detailed Description

Service location context.

Field Documentation

◆ blockId

T_S8 blockId[K_APEX_BLOCK_ID_MAX_SIZE]

Vehicle block identifier.

◆ dutyId

T_S8 dutyId[K_APEX_DUTY_ID_MAX_SIZE]

Driver duty identifier.

◆ extraJourneyId

T_S8 extraJourneyId[K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE]

Extra Journey identifier.

◆ journeyId

T_S8 journeyId[K_APEX_JOURNEY_ID_MAX_SIZE]

Journey identifier.

◆ lineId

T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE]

Line identifier.

◆ operationPlanId

T_S8 operationPlanId[K_APEX_OPERATION_PLAN_ID_MAX_SIZE]

Operation plan identifier.

◆ outOfBoundsType

ApexOutOfBoundsType outOfBoundsType

Identifies the activation type of the out of bounds validation.

When this field has a value other than APEX_OUT_OF_BOUNDS_TYPE_WITHIN_BOUNDS and the service location update. This out of bounds validation allows APEX to accept an invalid/unknown stopId identified as 'out of bounds'. When active the monthly tickets are always accepted, regardless of their stopId. In this example, the normal sequence of stops (stop1 -> stop2 -> stop3) suffers a diversion on stop2 through the given line and pattern.

```
ApexServiceLocation serviceLocation = { 0 };
ApexLastError apexError;

Set service location to stop1
serviceLocation.outOfBoundsType = APEX_OUT_OF_BOUNDS_TYPE_WITHIN_BOUNDS;
apexStatus = ApexSetContext(apexContext, APEX_CONTEXT_PARAM_ID_SERVICE_LOCATION);
stop1 is recognized so apexStatus equals to APEX_STATUS_NO_ERROR
Validate cards

(...)

Set service location to stopA
serviceLocation.outOfBoundsType = APEX_OUT_OF_BOUNDS_TYPE_WITHIN_BOUNDS;
apexStatus = ApexSetContext(apexContext, APEX_CONTEXT_PARAM_ID_SERVICE_LOCATION);
stopA is not recognized so apexStatus equals to APEX_STATUS_INVALID_SERVICE_LOCATION
apexStatus = ApexGetDetailedStatus(apexContext, &apexError);
apexError.apexDetailedStatus equals to APEX_DETAILED_STATUS_INVALID_STOP, which
serviceLocation.outOfBoundsType = APEX_OUT_OF_BOUNDS_TYPE_UNKNOWN_STOP;
apexStatus = ApexSetContext(apexContext, APEX_CONTEXT_PARAM_ID_SERVICE_LOCATION);
apexStatus equals to APEX_STATUS_NO_ERROR, so stopA has been set as the out of bounds
Validate cards out of bounds

(...)

Set service location to stop3
serviceLocation.outOfBoundsType = APEX_OUT_OF_BOUNDS_TYPE_WITHIN_BOUNDS;
apexStatus = ApexSetContext(apexContext, APEX_CONTEXT_PARAM_ID_SERVICE_LOCATION);
stop3 is recognized so apexStatus equals to APEX_STATUS_NO_ERROR
Out of bounds validation has been deactivated
Validate cards
```

◆ patternId

T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE]

Pattern identifier.

◆ **stopId**

T_S8 stopId[K_APEX_STOP_ID_MAX_SIZE]

Stop identifier.

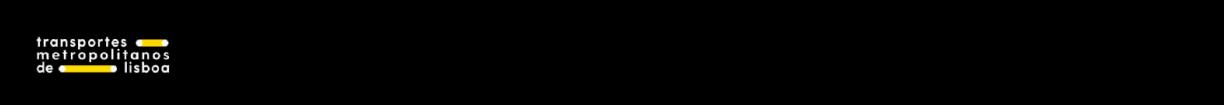
◆ **vehicleId**

T_U32 vehicleId

Vehicle identifier. This value will be written on the card's event.

The documentation for this struct was generated from the following file:

- [apex.h](#)



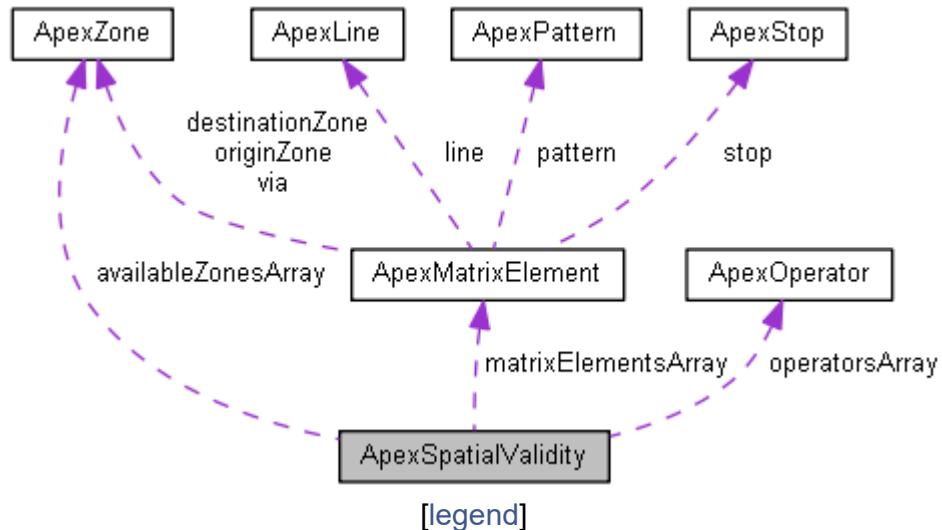
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ApexSpatialValidity Struct Reference

Spatial validity data. More...

```
#include <apexGlb.h>
```

Collaboration diagram for ApexSpatialValidity:



Data Fields

T_U16 `operatorsCount`

Number of elements in the operators array.
More...

`ApexOperator * operatorsArray`

Array of operators where the spatial validity is applied (dynamically allocated).

[More...](#)

T_U16 [availableZonesCount](#)

Number of elements in the available zones array. [More...](#)

ApexZone * [availableZonesArray](#)

Array of zones where the product is valid (dynamically allocated). [More...](#)

T_U8 [zonesNumberFromStart](#)

Number of valid zones counting from the zone where the product was validated.

[More...](#)

T_U16 [matrixElementsCount](#)

Number of elements in the matrix elements array. [More...](#)

ApexMatrixElement * [matrixElementsArray](#)

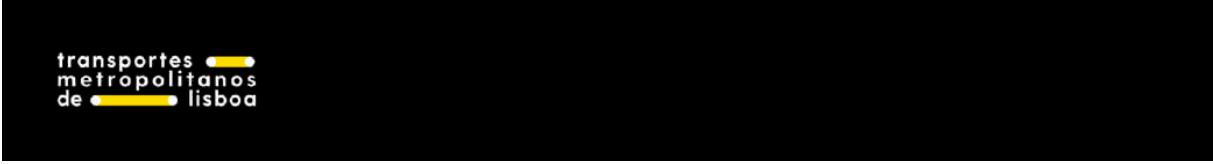
Array of matrix elements detailing the zones and/or line where the product is valid (dynamically allocated). [More...](#)

Detailed Description

Spatial validity data.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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ApexSpatialValidityData Struct Reference

Spatial validity data. More...

```
#include <apexGlb.h>
```

Data Fields

T_S8 **spatialValidityId**
[K_APEX_SPATIAL_VALIDITY_ID_MAX_SIZE]
Associated spatial validity identifier. More...

T_S8 **matrixElementId**
[K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE]
Product matrix element identifier. More...

T_U32 **zonesCount**
Number of entries with data in the zonesArray. More...

T_S8 **zonelIdArray**
[K_APEX_MAX_AVAILABLE_ZONES_COUNT]
[K_APEX_ZONE_ID_MAX_SIZE]
Array of zone identifiers. More...

Detailed Description

Spatial validity data.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexStop Struct Reference

Structure that describes a stop. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **stopId [K_APEX_STOP_ID_MAX_SIZE]**

Stop identifier. [More...](#)

T_S8 **stopName [K_APEX_STOP_NAME_MAX_SIZE]**

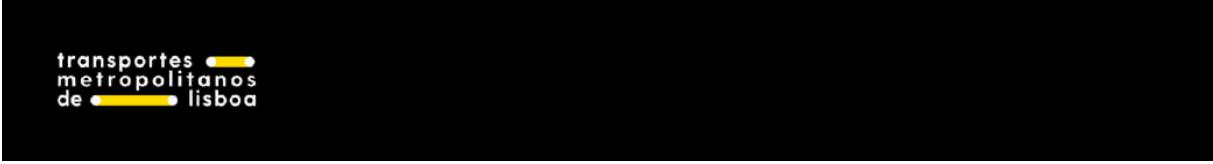
Stop name. [More...](#)

Detailed Description

Structure that describes a stop.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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de [REDACTED] lisboa



Data Fields

ApexStopInfo Struct Reference

Information of a stop. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **stopId [K_APEX_STOP_ID_MAX_SIZE]**

Stop identifier. [More...](#)

T_S8 **stopName [K_APEX_STOP_NAME_MAX_SIZE]**

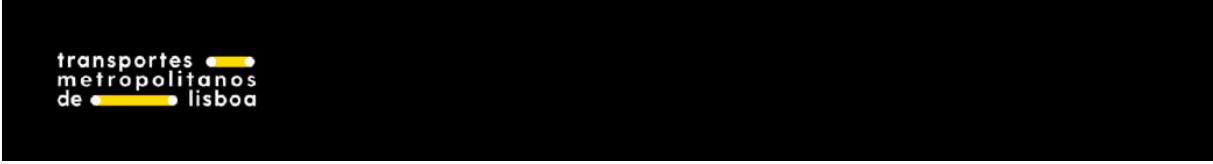
Stop name. [More...](#)

Detailed Description

Information of a stop.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



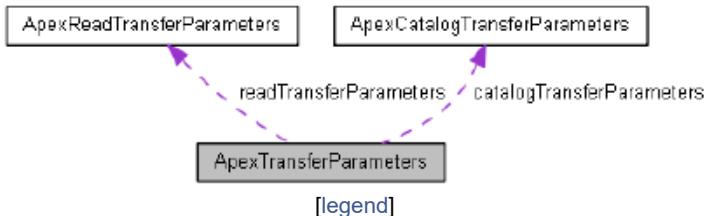
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ApexTransferParameters Struct Reference

Structure containing the input parameters for each of the transfer modes. [More...](#)

```
#include <apex.h>
```

Collaboration diagram for ApexTransferParameters:



Data Fields

ApexTransferMode **transferMode**

Mode of operation of the transferral function. [More...](#)

T_S8 **cardTypeId [K_APEX_CARD_TYPE_ID_MAX_SIZE]**

Identifier of the target card type. [More...](#)

ApexReadTransferParameters **readTransferParameters**

This parameter is used with transfer mode APEX_TRANSFER_MODE_READ. [More...](#)

T_U8 **contractNumber**

Number of the contract to be transferred to the card.
This parameter is used with transfer mode APEX_TRANSFER_MODE_LOAD_FROM_CARD. [More...](#)

ApexCatalogTransferParameters **catalogTransferParameters**

This parameter is used with transfer mode APEX_TRANSFER_MODE_LOAD_FROM_CATALOG. [More...](#)

Detailed Description

Structure containing the input parameters for each of the transfer modes.

Field Documentation

◆ cardTypeId

T_S8 cardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Identifier of the target card type.

◆ catalogTransferParameters

ApexCatalogTransferParameters catalogTransferParameters

This parameter is used with transfer mode
APEX_TRANSFER_MODE_LOAD_FROM_CATALOG.

◆ contractNumber

T_U8 contractNumber

Number of the contract to be transferred to the card. This parameter is used with transfer mode APEX_TRANSFER_MODE_LOAD_FROM_CARD.

This number must match one of the contract numbers passed as input parameter
(**ApexReadTransferParameters.contractNumber**) during the call to ApexTransfer with transfer mode APEX_TRANSFER_MODE_READ.

Note

The contract may have a different contract number in the target card after it is loaded.

◆ readTransferParameters

ApexReadTransferParameters readTransferParameters

This parameter is used with transfer mode APEX_TRANSFER_MODE_READ.

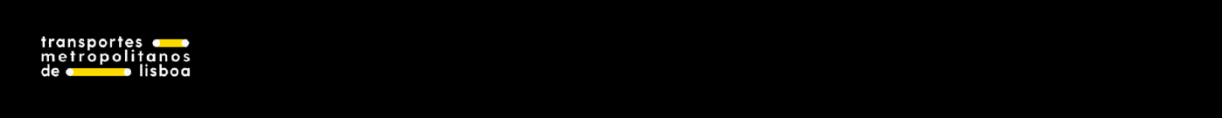
◆ transferMode

ApexTransferMode transferMode

Mode of operation of the transferral function.

The documentation for this struct was generated from the following file:

- [apex.h](#)



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Data Fields

ApexTripDuration Struct Reference

Structure that indicates the trip duration. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_UtilDateTime **initialDateTime**
Initial date/time of the trip. [More...](#)

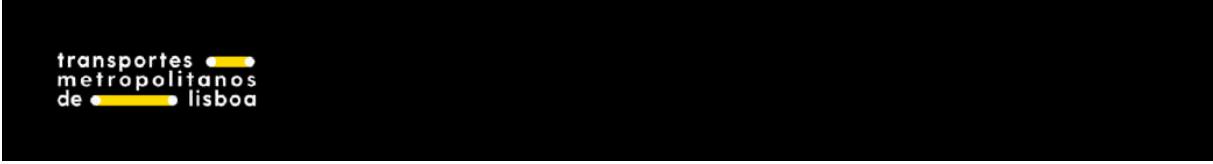
T_UtilDateTime **finalDateTime**
Final date/time of the trip. [More...](#)

Detailed Description

Structure that indicates the trip duration.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



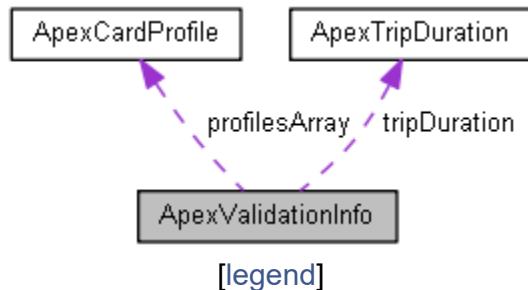
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ApexValidationInfo Struct Reference

Structure that indicates the remaining and decremented units of the card and the name of the contract(s) validated. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexValidationInfo:



Data Fields

ApexValidationStatus validationStatus

Validation result status. [More...](#)

T_S8 **productId**
[K_APEX_PRODUCT_ID_MAX_SIZE]
Product identifier. [More...](#)

T_S8 **productName**
[K_APEX_PRODUCT_NAME_MAX_SIZE]
Product name. [More...](#)

T_U8 [productHasExpirationDate](#)
Indicates if the product has an expiration date. [More...](#)

T_UtilDateTime [productExpirationDate](#)
Product expiration date (present if productHasExpirationDate is set). [More...](#)

ApexUnitType [unitType](#)
Type of units considered. [More...](#)

T_U32 [decrementedUnits](#)
Number of units decremented (present if unitType is not NONE). [More...](#)

T_U32 [remainingUnits](#)
Number of units remaining (present if unitType is not NONE). [More...](#)

T_U16 [profilesCount](#)
Number of elements in the profiles array.
[More...](#)

**ApexCardProfile [profilesArray](#)
[K_APEX_PROFILES_MAX_SIZE]**
Array of profiles used in the validation (present if profilesCount is bigger than 0).
[More...](#)

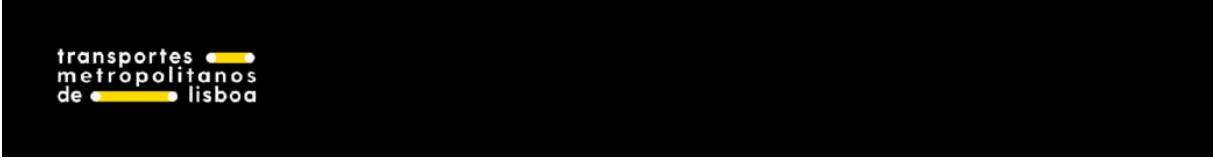
ApexTripDuration [tripDuration](#)
Trip duration according with the operator's exploration period. [More...](#)

Detailed Description

Structure that indicates the remaining and decremented units of the card and the name of the contract(s) validated.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexVersion Struct Reference

Describes the API-APEX version data structure. [More...](#)

```
#include <apex.h>
```

Data Fields

T_S8 **apiApexVersion**
[[K_APEX_LIBRARY_VERSION_MAX_SIZE](#)]
API-APEX version. [More...](#)

T_S8 **apiVivaVersion**
[[K_APEX_LIBRARY_VERSION_MAX_SIZE](#)]
API VIVA version.
Only present if Apex has already been initialized. [More...](#)

Detailed Description

Describes the API-APEX version data structure.

Field Documentation

◆ apiApexVersion

T_S8 apiApexVersion[K_APEX_LIBRARY_VERSION_MAX_SIZE]

API-APEX version.

Template: MMM.mmm.rrr
MMM - major.
mmm - minor.
rrr - revision.

◆ apiVivaVersion

T_S8 apiVivaVersion[K_APEX_LIBRARY_VERSION_MAX_SIZE]

API VIVA version.

Only present if Apex has already been initialized.

Template: MMM.mmm.rrr
MMM - major.
mmm - minor.
rrr - revision.

The documentation for this struct was generated from the following file:

- [apex.h](#)
-

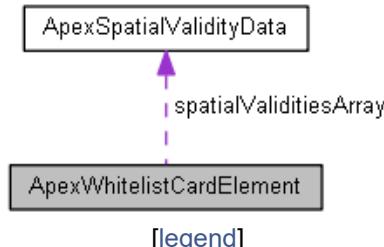
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ApexWhitelistCardElement Struct Reference

Information of the Whitelist (card) element. [More...](#)

```
#include <apexGlb.h>
```

Collaboration diagram for ApexWhitelistCardElement:



Data Fields

T_S8 **whitelistItemId**
[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]

Identifier of the whitelist element. [More...](#)

T_S8 **cardTypeId**
[K_APEX_CARD_TYPE_ID_MAX_SIZE]

Card type identifier. [More...](#)

T_U64 **cardSerialNumber**

Card serial number. [More...](#)

T_S8 **productLongId**

[K_APEX_PRODUCT_ID_MAX_SIZE]

Product to which this whitelist element is applied.

[More...](#)

T_U32 **spatialValiditiesCount**

Number of entries in the spatialValiditiesArray.

[More...](#)

ApexSpatialValidityData * **spatialValiditiesArray**

Array of spatial validity associations. [More...](#)

T_UtilDateTime **startDate**

Start date of the whitelist element effective period. [More...](#)

T_U8 **hasEndDate**

Indicates if the "endDate" field was set. [More...](#)

T_UtilDateTime **endDate**

End date of the whitelist element effective period (inclusive). [More...](#)

ApexAntipassbackMode **antipassbackMode**

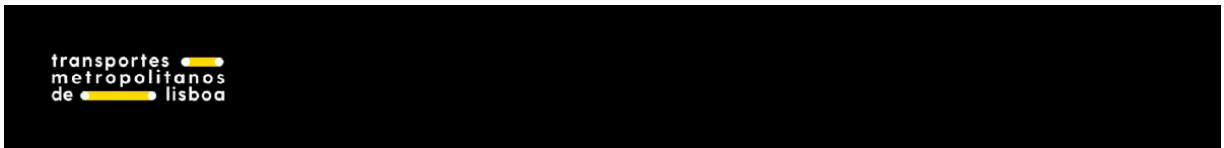
Anti-passback mode to be used for the whitelist element. [More...](#)

Detailed Description

Information of the Whitelist (card) element.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



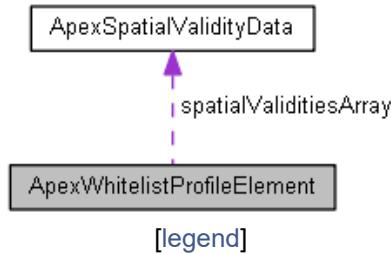
transportes [REDACTED]
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de [REDACTED] lisboa

ApexWhitelistProfileElement Struct Reference

Information of the Whitelist (Profile) element. More...

```
#include <apexGlb.h>
```

Collaboration diagram for ApexWhitelistProfileElement:



Data Fields

T_S8 **whitelistItemId**
[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE]
Identifier of the whitelist element. More...

T_S8 **productLongId**
[K_APEX_PRODUCT_ID_MAX_SIZE]
Product to which this whitelist element is applied.
More...

T_U32 **spatialValiditiesCount**
Number of entries in the spatialValiditiesArray.
More...

ApexSpatialValidityData * **spatialValiditiesArray**
Array of spatial validity associations. More...

T_UtilDateTime **startDate**
Start date of the whitelist element effective

period. [More...](#)

T_U8 [hasEndDate](#)

Indicates if the "endDate" field was set. [More...](#)

T_UtilDateTime [endDate](#)

End date of the whitelist element effective period (inclusive). [More...](#)

ApexAntipassbackMode [antipassbackMode](#)

Anti-passback mode to be used for the whitelist element. [More...](#)

T_U16 [usedProfilesCount](#)

Number of entries with data in the usedProfilesIdArray. [More...](#)

T_S8 [usedProfilesIdArray](#)

[\[K_APEX_PROFILES_MAX_SIZE\]](#)

[\[K_APEX_PROFILE_ID_MAX_SIZE\]](#)

Array of profile identifiers. [More...](#)

Detailed Description

Information of the Whitelist (Profile) element.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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Data Fields

ApexZone Struct Reference

Structure that describes a zone. [More...](#)

```
#include <apexGlb.h>
```

Data Fields

T_S8 **zonId [K_APEX_ZONE_ID_MAX_SIZE]**

Zone identifier. [More...](#)

T_S8 **zoneName [K_APEX_ZONE_NAME_MAX_SIZE]**

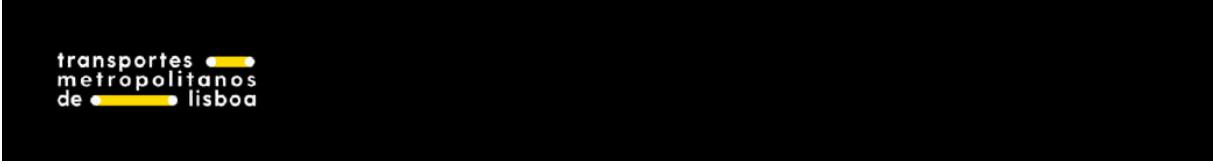
Zone name. [More...](#)

Detailed Description

Structure that describes a zone.

The documentation for this struct was generated from the following file:

- [apexGlb.h](#)
-



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metropolitano[s] [REDACTED]
de [REDACTED] lisboa

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a

ApexBinary	ApexConfirmCancelInfo	ApexGetInfractionsI
ApexBlacklistCardElement	ApexConfirmTransferInfo	ApexGetLinesInputP
ApexBlacklistSamElement	ApexConfirmValidationInfo	ApexGreenlistEleme
ApexCancelParameters	ApexContract	ApexGreenlistLoadP
ApexCardBinaries	ApexContractCharacteristics	ApexGreylistElemen
ApexCardData	ApexContractRestrictions	ApexHolderId
ApexCardDataExtra	ApexContractTemporalValidity	ApexInfraction
ApexCardDetectedInfo	ApexControlFine	ApexInfractionAttrib
ApexCardInfo	ApexControlOutputData	ApexInfractionAttrib
ApexCardProfile	ApexControlServiceLocation	ApexInfractions
ApexCardReaderConfig	ApexDamagedCardInfo	ApexInitParameters
ApexCardSamAssociation	ApexEnvironment	ApexIssueData
ApexCardTypeId	ApexEvent	ApexLastError
ApexCatalog	ApexEventContractUsage	ApexLine
ApexCatalogProduct	ApexFileHeaderInfo	ApexLineInfo
ApexCatalogTransferParameters	ApexFine	ApexLinesInfo
ApexCheckConfigFilesInputParameters	ApexFineAttribute	ApexLogConfig
ApexConfigurePreSelectionParameters	ApexFineAttributes	ApexLowLevelError
ApexConfigureProductParameters	ApexFines	ApexLoyaltyData
	ApexGetCatalogParameters	ApexLoyaltyOperato
	ApexGetFinesInputParameters	ApexLoyaltyOperato

a



Here is a list of all struct and union fields with links to the structures/unions they belong to:

- a -

- actionListsFullFilename :
[ApexCheckConfigFilesInputParameters](#) ,
[ApexInitParameters](#)
- allowsReloadFlag :
[ApexContract](#)
- antennaNumber :
[ApexCardReaderConfig](#)
- antipassbackMode :
[ApexWhitelistCardElement](#) ,
[ApexWhitelistProfileElement](#)
- apexDetailedStatus :
[ApexLastError](#)
- apexMinVersion :
[ApexFileHeaderInfo](#)
- apexStatus :
[ApexLastError](#)
- apiApexVersion :
[ApexVersion](#)
- apiVivaVersion :
[ApexVersion](#)
- applicationIssuerCode :
[ApexEnvironment](#)
- applicationIssuerId :
[ApexEnvironment](#)
- applicationIssuerName :
[ApexEnvironment](#)
- applicationIssuerShortName :
[ApexEnvironment](#)
- attachedDocumentName :
[ApexControlFine](#)
- attachedDocumentObs :
[ApexControlFine](#)
- attachedDocumentType :
[ApexControlFine](#)
- authorizationId :
[ApexGreenlistElement](#)
- autoIncreaseFlag :
[ApexPerformanceConfig](#)
- availableZonesArray :
[ApexSpatialValidity](#)
- availableZonesCount :
[ApexSpatialValidity](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- b -

- binaryData : [ApexBinary](#)
 - binaryDataSize : [ApexBinary](#)
 - blockId : [ApexControlServiceLocation](#) ,
[ApexServiceLocation](#)
-

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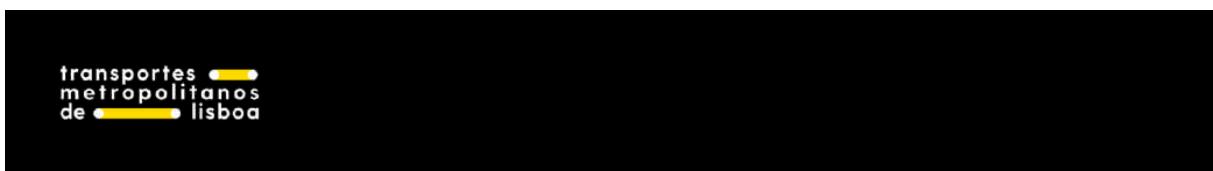
Here is a list of all struct and union fields with links to the structures/unions they belong to:

- C -

- cacheOptimizationFlag : [ApexConfigureProductParameters](#) , [ApexGetCatalogParameters](#) , [ApexGreenlistLoadParameters](#)
- calypsoNativeMode : [ApexCardReaderConfig](#)
- capacity : [ApexPerformanceConfig](#)
- cardBlacklistItemId : [ApexBlacklistCardElement](#)
- cardData : [ApexControlOutputData](#) , [ApexReadCardOutputData](#)
- cardDataExtra : [ApexReadCardOutputData](#)
- cardDataModel : [ApexCardInfo](#) , [ApexGreylistElement](#)
- cardFamily : [ApexCardDetectedInfo](#)
- cardFilterFlag : [ApexGetCatalogParameters](#)
- cardInBlacklistFlag : [ApexReadCardOutputData](#)
- cardInfo : [ApexCardDetectedInfo](#) , [ApexControlOutputData](#) , [ApexReadCardOutputData](#)
- cardInfoLength : [ApexCardDetectedInfo](#)
- cardIssuer : [ApexDamagedCardInfo](#)
- cardNumber : [ApexDamagedCardInfo](#) , [ApexEnvironment](#)
- cardPhysicalType : [ApexCardDetectedInfo](#) , [ApexCardInfo](#)
- cardReaderId : [ApexCardSamAssociation](#)
- cardSerialNumber : [ApexBlacklistCardElement](#) , [ApexCardDetectedInfo](#) , [ApexCardInfo](#) , [ApexDamagedCardInfo](#) , [ApexGreenlistElement](#) , [ApexGreylistElement](#) , [ApexWhitelistCardElement](#)
- cardTypeId : [ApexBlacklistCardElement](#) , [ApexCardInfo](#) , [ApexConfigureProductParameters](#) , [ApexDamagedCardInfo](#)

- , **ApexGreenlistElement** , **ApexGreylistElement** ,
ApexTransferParameters , **ApexWhitelistCardElement**
- cardTypeIdsArray : **ApexCatalogProduct**
- cardTypeIdsCount : **ApexCatalogProduct**
- cardValidityState : **ApexCardDetectedInfo** , **ApexCardInfo**
- catalogProductsArray : **ApexCatalog**
- catalogProductsCount : **ApexCatalog**
- catalogTransferParameters : **ApexTransferParameters**
- channelId : **ApexCheckConfigFilesInputParameters** ,
ApexInitParameters , **ApexOperatorConfig**
- characteristics : **ApexContract**
- civilNumber : **ApexHolderId**
- clientLevel : **ApexLoyaltyOperatorData**
- comOfferFullFilename :
ApexCheckConfigFilesInputParameters ,
ApexInitParameters
- configId : **ApexProductParameter**
- configurationId : **ApexCatalogTransferParameters** ,
ApexPreSelectionConfiguration ,
ApexPreSelectionParameters , **ApexProductConfiguration**
- configureMode : **ApexConfigureProductParameters**
- contractBinariesArray : **ApexCardBinaries**
- contractBinary : **ApexConfigureProductParameters**
- contractCount : **ApexReadTransferParameters**
- contractDuration : **ApexContractTemporalValidity**
- contractDurationType : **ApexContractTemporalValidity**
- contractInGreylistFlag : **ApexContract**
- contractNumber : **ApexCancelParameters** ,
ApexConfigurePreSelectionParameters , **ApexContract** ,
ApexEventContractUsage , **ApexReadTransferParameters** ,
ApexTransferParameters
- contractsArray : **ApexCardData**
- contractsCount : **ApexCardData**
- contractsInGreenlistFlag : **ApexControlOutputData** ,
ApexReadCardOutputData
- contractStartDate : **ApexGreenlistElement**
- contractStatus : **ApexGetInfractionsInputParameters**
- contractStatusArray : **ApexControlOutputData**
- contractStatusCount : **ApexControlOutputData**

- contractStatusMask : **ApexInfraction**
 - contractsUsedMask : **ApexEvent , ApexParkData**
 - contractUnits : **ApexContract**
 - controllerDocumentType : **ApexControlFine**
 - controllerIdentityNumber : **ApexControlFine**
 - controlStatus : **ApexControlOutputData**
 - corrCardIssuer : **ApexCatalogTransferParameters**
 - corrCardNumber : **ApexCatalogTransferParameters**
 - corrCardSerialNumber : **ApexCatalogTransferParameters**
 - corrCardTypeId : **ApexCatalogTransferParameters**
 - countryCode : **ApexEnvironment**
 - couplerConfiguration : **ApexCardReaderConfig , ApexSamReaderConfig**
 - cscType : **ApexCardReaderConfig , ApexSamReaderConfig**
 - currencyCode : **ApexEnvironment**
-



Here is a list of all struct and union fields with links to the structures/unions they belong to:

- d -

- dailyUsageRate : [ApexContractCharacteristics](#)
- dailyUsageRateFlag : [ApexCancelParameters](#)
- dailyUsageValue : [ApexConfirmCancelInfo](#)
- dateTimeValue : [ApexProductParameter](#)
- decrementedUnits : [ApexValidationInfo](#)
- description : [ApexFine](#) , [ApexFineAttribute](#) , [ApexInfraction](#) , [ApexInfractionAttribute](#) , [ApexProductCategory](#)
- destinationStopId : [ApexControlServiceLocation](#)
- destinationZone : [ApexMatrixElement](#)
- destinationZoneId : [ApexEvent](#)
- destinationZoneName : [ApexProductSpatialValidityChoice](#)
- destinationZonesArray : [ApexPreSelectionConfiguration](#)
- destinationZonesCount : [ApexPreSelectionConfiguration](#)
- destinationZoneSelectedIndex :
[ApexPreSelectionConfiguration](#)
- deviceld : [ApexEvent](#) , [ApexInitParameters](#) , [ApexOperatorConfig](#) , [ApexParkData](#)
- dutyId : [ApexControlServiceLocation](#) , [ApexServiceLocation](#)



Here is a list of all struct and union fields with links to the structures/unions they belong to:

- e -

- endDate : [ApexBlacklistSamElement](#) , [ApexCardProfile](#) , [ApexEnvironment](#) , [ApexLoyaltyOperatorRecord](#) , [ApexWhitelistCardElement](#) , [ApexWhitelistProfileElement](#)
- environment : [ApexCardData](#)
- environmentBinary : [ApexCardBinaries](#)
- environmentStatus : [ApexControlOutputData](#) , [ApexGetInfrctionsInputParameters](#)
- environmentStatusMask : [ApexInfraction](#)
- errorType : [ApexLowLevelError](#)
- event : [ApexCardData](#)
- eventBinary : [ApexCardBinaries](#)
- eventContractUsageArray : [ApexEvent](#) , [ApexParkData](#)
- eventContractUsageCount : [ApexEvent](#) , [ApexParkData](#)
- eventDateTime : [ApexEvent](#) , [ApexParkData](#)
- eventOperatorId : [ApexEvent](#) , [ApexParkData](#)
- eventType : [ApexConfirmValidationInfo](#) , [ApexEvent](#) , [ApexParkData](#)
- exitDateLimit : [ApexParkData](#)
- exitTimeLimit : [ApexParkData](#)
- expirationDate : [ApexPaperTicketData](#)
- externalLogger : [ApexLogConfig](#)
- extraJourneyId : [ApexControlServiceLocation](#) , [ApexServiceLocation](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- f -

- fileDate : [ApexFileInfo](#)
- fileEndDate : [ApexFileInfo](#)
- fileFormatVersion : [ApexFileInfo](#)
- fileStartDate : [ApexFileInfo](#)
- fileVersion : [ApexFileInfo](#)
- finalDateTime : [ApexTripDuration](#)
- fineAmount : [ApexControlFine](#)
- fineAttributelD : [ApexGetFinesInputParameters](#)
- fineAttributesArray : [ApexFine](#) , [ApexFineAttributes](#)
- fineAttributesCount : [ApexFine](#) , [ApexFineAttributes](#)
- finelD : [ApexControlFine](#)
- fineOperatorlD : [ApexControlFine](#)
- finesArray : [ApexFines](#)
- finesCount : [ApexFines](#)
- firstDateTime : [ApexEventContractUsage](#)
- fullFileName : [ApexLogConfig](#) , [ApexPerformanceConfig](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- g -

- graphicalLayout : [ApexEnvironment](#)
 - greenlistItemId : [ApexGreenlistElement](#)
 - greylistItemId : [ApexGreylistElement](#)
 - groupDimension : [ApexContractCharacteristics](#) ,
[ApexProductSalesPackage](#) ,
[ApexProductSalesPackageChoice](#)
 - groupFlag : [ApexCatalogProduct](#)
-

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- h -

- hasCardDataModel : [ApexGreylistElement](#)
- hasEndDate : [ApexBlacklistSamElement](#) , [ApexWhitelistCardElement](#) , [ApexWhitelistProfileElement](#)
- hasLoadDate : [ApexGreylistElement](#)
- hasLoadSequenceNumber : [ApexGreylistElement](#)
- hasMachineCode : [ApexGreylistElement](#)
- hasPhysicalSupport : [ApexProductConfiguration](#)
- hasStartDate : [ApexBlacklistSamElement](#)
- holderBirthDate : [ApexEnvironment](#)
- holderCompany : [ApexEnvironment](#)
- holderCompanyName : [ApexEnvironment](#)
- holderCompanyShortName : [ApexEnvironment](#)
- holderId : [ApexCardData](#)
- holderIdBinary : [ApexCardBinaries](#)
- holderNumber : [ApexEnvironment](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- i -

- id : [ApexCardReaderConfig](#) , [ApexCardTypeld](#) , [ApexFine](#) , [ApexFineAttribute](#) , [ApexInfraction](#) , [ApexInfractionAttribute](#) , [ApexSamReaderConfig](#)
- includePatternsFlag : [ApexGetLinesInputParameters](#)
- includeStopsFlag : [ApexGetLinesInputParameters](#)
- infractionAttributeld : [ApexGetInfractionsInputParameters](#)
- infractionAttributesArray : [ApexInfraction](#) , [ApexInfractionAttributes](#)
- infractionAttributesCount : [ApexInfraction](#) , [ApexInfractionAttributes](#)
- infractionDate : [ApexControlFine](#)
- infractionDescription : [ApexControlFine](#)
- infractionId : [ApexControlFine](#) , [ApexGetFinesInputParameters](#)
- infractionNoticeDate : [ApexControlFine](#)
- infractionNumber : [ApexControlFine](#)
- infractionPlace : [ApexControlFine](#)
- infractionsArray : [ApexFine](#) , [ApexInfractions](#)
- infractionsCount : [ApexFine](#) , [ApexInfractions](#)
- initialDateTime : [ApexTripDuration](#)
- interchangeAllowedFlag : [ApexContract](#)
- invoiceNumber : [ApexPaymentInfo](#)
- isODPreSelectionFlag : [ApexConfigurePreSelectionParameters](#) , [ApexPreSelectionConfiguration](#)
- isSelectedFlag : [ApexProductSalesPackageChoice](#) , [ApexProductSpatialValidityChoice](#) ,

ApexProductZoneChoice

- issueEnvironment : **ApexIssueData**
 - issueHolderId : **ApexIssueData**
 - issueMode : **ApexIssueData**
 - issuerData : **ApexEnvironment , ApexEvent , ApexHolderId**
 - issuerAxisSize : **ApexEnvironment , ApexEvent , ApexHolderId**
 - issuingDate : **ApexEnvironment**
 - isValid : **ApexPreSelectionConfiguration**
-

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- j -

- journeyId : [ApexControlServiceLocation](#) , [ApexServiceLocation](#)
 - journeyInterchanges : [ApexEvent](#)
-

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- k -

- kvc : [ApexCardDetectedInfo](#)
-

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- | -

- level : [ApexProductCategory](#)
- line : [ApexMatrixElement](#)
- lineId : [ApexControlServiceLocation](#) , [ApexEvent](#) , [ApexGetLinesInputParameters](#) , [ApexLine](#) , [ApexLineInfo](#) , [ApexServiceLocation](#)
- lineInfoArray : [ApexLinesInfo](#)
- lineInfoCount : [ApexLinesInfo](#)
- lineName : [ApexLine](#) , [ApexLineInfo](#) , [ApexPaperTicketData](#) , [ApexProductSpatialValidityChoice](#)
- loadDate : [ApexGreylistElement](#)
- loadEndDate : [ApexLoyaltyOperatorRecord](#)
- loadSequenceNumber : [ApexGreylistElement](#)
- locationFilterFlag : [ApexGetCatalogParameters](#)
- locationId : [ApexParkData](#)
- logLevel : [ApexLogConfig](#)
- logType : [ApexLogConfig](#)
- lowLevelError : [ApexLastError](#)
- loyaltyBinariesArray : [ApexCardBinaries](#)
- loyaltyDataNumber : [ApexLoyaltyData](#)
- loyaltyOperator : [ApexLoyaltyOperatorData](#)
- loyaltyRecordsArray : [ApexCardDataExtra](#)
- loyaltyRecordsCount : [ApexCardDataExtra](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- m -

- machineCode : [ApexGreylevelElement](#) , [ApexInitParameters](#) , [ApexOperatorConfig](#)
- materializationType : [ApexCatalogProduct](#) , [ApexContractCharacteristics](#)
- matrixElementId : [ApexSpatialValidityData](#)
- matrixElementsArray : [ApexSpatialValidity](#)
- matrixElementsCount : [ApexSpatialValidity](#)
- maxAmount : [ApexFine](#)
- maxContractBinaries : [ApexCardBinaries](#)
- maxContracts : [ApexCardData](#)
- maxDailyUsage : [ApexContractRestrictions](#)
- maxLoyaltyBinaries : [ApexCardBinaries](#)
- mediaType : [ApexEnvironment](#)
- minAmount : [ApexFine](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- n -

- name : [ApexHolderId](#)
 - networkFullFilename :
[ApexCheckConfigFilesInputParameters](#) ,
[ApexInitParameters](#)
 - networkId : [ApexContract](#) , [ApexEnvironment](#) , [ApexEvent](#) ,
[ApexParkData](#)
 - numDailyFilePath : [ApexInitParameters](#) ,
[ApexOperatorConfig](#)
 - numDailyMaxValue : [ApexInitParameters](#) ,
[ApexOperatorConfig](#)
 - numDailyMinValue : [ApexInitParameters](#) ,
[ApexOperatorConfig](#)
 - numValue : [ApexProductParameter](#)
 - numValue64 : [ApexProductParameter](#)
-



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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- O -

- offenderAddress : [ApexControlFine](#)
- offenderBirthDate : [ApexControlFine](#)
- offenderDocumentType : [ApexControlFine](#)
- offenderIdentityNumber : [ApexControlFine](#)
- offenderName : [ApexControlFine](#)
- offenderPostalCode : [ApexControlFine](#)
- offenderVatNumber : [ApexControlFine](#)
- onlineCheckFlag : [ApexGreenlistElement](#)
- operationPlanId : [ApexControlServiceLocation](#) ,
[ApexServiceLocation](#)
- operationsAllowed : [ApexCatalogProduct](#)
- operatordataArray : [ApexLoyaltyData](#)
- operatorDataCount : [ApexLoyaltyData](#)
- operatorId : [ApexCheckConfigFilesInputParameters](#) ,
[ApexInitParameters](#) , [ApexOperator](#) , [ApexOperatorConfig](#)
- operatorName : [ApexOperator](#) , [ApexPaperTicketData](#)
- operatorsArray : [ApexSpatialValidity](#)
- operatorsCount : [ApexSpatialValidity](#)
- operatorShortName : [ApexOperator](#) , [ApexPaperTicketData](#)
- originStopId : [ApexControlServiceLocation](#)
- originZone : [ApexMatrixElement](#)
- originZoneId : [ApexEvent](#)
- originZoneName : [ApexProductSpatialValidityChoice](#)
- originZonesArray : [ApexPreSelectionConfiguration](#)
- originZonesCount : [ApexPreSelectionConfiguration](#)
- originZoneSelectedIndex : [ApexPreSelectionConfiguration](#)
- outOfBoundsType : [ApexServiceLocation](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- p -

- parameterArray : [ApexProductConfiguration](#)
- parameterCount : [ApexProductConfiguration](#)
- parkBinary : [ApexCardBinaries](#)
- parkData : [ApexCardDataExtra](#)
- pattern : [ApexMatrixElement](#)
- patternId : [ApexControlServiceLocation](#) , [ApexEvent](#) ,
[ApexGetLinesInputParameters](#) , [ApexPattern](#) ,
[ApexPatternInfo](#) , [ApexServiceLocation](#)
- patternInfoArray : [ApexLineInfo](#)
- patternInfoCount : [ApexLineInfo](#)
- patternName : [ApexPaperTicketData](#) , [ApexPattern](#) ,
[ApexPatternInfo](#)
- paymentInfo : [ApexCancelParameters](#)
- paymentMethod : [ApexPaymentInfo](#)
- periodRemainingTrips : [ApexEventContractUsage](#)
- periodStart : [ApexEventContractUsage](#)
- personalizationId : [ApexGreenlistElement](#)
- physicalSupport : [ApexProductConfiguration](#)
- preSelectionMode : [ApexPreSelectionParameters](#)
- preSelectionODType : [ApexContractCharacteristics](#)
- preSelectionType : [ApexContractCharacteristics](#)
- preValidationStatus : [ApexContract](#)
- price : [ApexCancelParameters](#) , [ApexConfirmCancellInfo](#) ,
[ApexPaperTicketData](#) , [ApexPhysicalSupport](#) ,
[ApexProductConfiguration](#) , [ApexProductSalesPackage](#) ,
[ApexProductSalesPackageChoice](#)
- priceAmount : [ApexParkData](#)

- procedure : **ApexInfraction**
- productCategoriesArray : **ApexCatalogProduct**
- productCategoriesCount : **ApexCatalogProduct**
- productExpirationDate : **ApexValidationInfo**
- productHasExpirationDate : **ApexValidationInfo**
- productId : **ApexCatalogProduct** ,
ApexConfigureProductParameters ,
ApexConfirmCancelInfo , **ApexConfirmTransferInfo** ,
ApexConfirmValidationInfo , **ApexContract** ,
ApexPhysicalSupport , **ApexValidationInfo**
- productLongId : **ApexGreenlistElement** ,
ApexGreylistElement , **ApexWhitelistCardElement** ,
ApexWhitelistProfileElement
- productName : **ApexCatalogProduct** ,
ApexConfirmCancelInfo , **ApexConfirmTransferInfo** ,
ApexConfirmValidationInfo , **ApexContract** ,
ApexPhysicalSupport , **ApexValidationInfo**
- productQuantity : **ApexCancelParameters**
- profileCombinationsArray : **ApexCatalogProduct**
- profileCombinationsCount : **ApexCatalogProduct**
- profileId : **ApexCardProfile** , **ApexProfile**
- profileName : **ApexCardProfile** , **ApexProfile**
- profileNumber : **ApexCardProfile**
- profilesArray : **ApexConfirmValidationInfo** ,
ApexEnvironment , **ApexProfileCombination** ,
ApexValidationInfo
- profilesCount : **ApexConfirmValidationInfo** ,
ApexEnvironment , **ApexProfileCombination** ,
ApexValidationInfo
- profilesUsedMask : **ApexEvent** , **ApexParkData**
- profileValidationFlag : **ApexConfirmValidationInfo**
- promptAmount : **ApexFine**

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- r -

- readerAddress : [ApexCardReaderConfig](#) , [ApexSamReaderConfig](#)
- readHolderIdFlag : [ApexReadCardInputParameters](#)
- readLoyaltyDataFlag : [ApexReadCardInputParameters](#)
- readParkDataFlag : [ApexReadCardInputParameters](#)
- readTransferParameters : [ApexTransferParameters](#)
- recordsArray : [ApexLoyaltyOperatorData](#)
- recordsCount : [ApexLoyaltyOperatorData](#)
- rehabilitationDate : [ApexEnvironment](#)
- remainingUnits : [ApexValidationInfo](#)
- requiredContractNumber : [ApexContract](#)
- restrictions : [ApexContract](#)
- restrictTime : [ApexContract](#)
- rightExtensionType : [ApexCatalogProduct](#) , [ApexContractCharacteristics](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- S -

- saleCount : [ApexContract](#)
- saleDate : [ApexConfirmCancelInfo](#) ,
[ApexConfirmTransferInfo](#) , [ApexContract](#) ,
[ApexPaperTicketData](#)
- saleOperator : [ApexContract](#)
- saleSamMachineId : [ApexContract](#)
- salesPackageChoiceArray : [ApexProductParameter](#)
- salesPackageChoiceCount : [ApexProductParameter](#)
- salesPackageID : [ApexCancelParameters](#)
- salesPackageId : [ApexGreenlistElement](#) ,
[ApexPhysicalSupport](#) , [ApexProductSalesPackage](#) ,
[ApexProductSalesPackageChoice](#)
- salesPackagesArray : [ApexCatalogProduct](#)
- salesPackagesCount : [ApexCatalogProduct](#)
- samAtr : [ApexSamReaderConfig](#)
- samAtrLen : [ApexSamReaderConfig](#)
- samBlacklistItemId : [ApexBlacklistSamElement](#)
- samInBlacklistFlag : [ApexContract](#) ,
[ApexReadCardOutputData](#)
- samReaderId : [ApexCardSamAssociation](#)
- samSerialNumber : [ApexBlacklistSamElement](#)
- samTypeId : [ApexBlacklistSamElement](#) ,
[ApexSamReaderConfig](#)
- searchMode : [ApexCardReaderConfig](#)
- securityData : [ApexPaperSaleAckParameters](#) ,
[ApexPaperTicketData](#)
- slotNumber : [ApexSamReaderConfig](#)

- spatialValiditiesArray : **ApexContract** , **ApexGreenlistElement** , **ApexWhitelistCardElement** , **ApexWhitelistProfileElement**
- spatialValiditiesCount : **ApexContract** , **ApexGreenlistElement** , **ApexWhitelistCardElement** , **ApexWhitelistProfileElement**
- spatialValidityChoiceArray : **ApexProductParameter**
- spatialValidityChoiceCount : **ApexProductParameter**
- spatialValidityId : **ApexProductSpatialValidityChoice** , **ApexSpatialValidityData**
- startDate : **ApexBlacklistSamElement** , **ApexCardProfile** , **ApexLoyaltyOperatorRecord** , **ApexWhitelistCardElement** , **ApexWhitelistProfileElement**
- status : **ApexProductConfiguration**
- status1 : **ApexLowLevelError**
- status2 : **ApexLowLevelError**
- stop : **ApexMatrixElement**
- stopId : **ApexEvent** , **ApexServiceLocation** , **ApexStop** , **ApexStopInfo**
- stopInfoArray : **ApexPatternInfo**
- stopInfoCount : **ApexPatternInfo**
- stopName : **ApexPaperTicketData** , **ApexStop** , **ApexStopInfo**

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- t -

- taxPercentage : [ApexPaperTicketData](#) ,
[ApexPhysicalSupport](#) , [ApexProductSalesPackage](#) ,
[ApexProductSalesPackageChoice](#)
- taxValue : [ApexPhysicalSupport](#) ,
[ApexProductSalesPackage](#) ,
[ApexProductSalesPackageChoice](#)
- techParamsFullFilename :
[ApexCheckConfigFilesInputParameters](#) ,
[ApexInitParameters](#)
- temporalUnits : [ApexConfirmCancelInfo](#)
- temporalUnitsType : [ApexConfirmCancelInfo](#)
- temporalValidity : [ApexContract](#)
- textValue : [ApexProductParameter](#)
- ticketNumber : [ApexPaperSaleAckParameters](#) ,
[ApexPaperTicketData](#)
- timeBetweenPassengers : [ApexContractCharacteristics](#)
- transactionId : [ApexControlOutputData](#)
- transferMode : [ApexTransferParameters](#)
- tripClass : [ApexContractCharacteristics](#)
- tripDuration : [ApexContractTemporalValidity](#) ,
[ApexValidationInfo](#)
- tripDurationType : [ApexContractTemporalValidity](#)
- type : [ApexProductParameter](#)



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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- U -

- units : [ApexConfirmCancelInfo](#) , [ApexConfirmTransferInfo](#)
- unitsNumber : [ApexProductSalesPackage](#) ,
[ApexProductSalesPackageChoice](#)
- unitsQuantity : [ApexCancelParameters](#)
- unitsToDebit : [ApexConfirmValidationInfo](#)
- unitType : [ApexConfirmCancelInfo](#) ,
[ApexConfirmTransferInfo](#) , [ApexContractCharacteristics](#) ,
[ApexValidationInfo](#)
- usageData : [ApexEventContractUsage](#)
- usageDays : [ApexCancelParameters](#)
- usedProfilesCount : [ApexWhitelistProfileElement](#)
- usedProfilesIdArray : [ApexWhitelistProfileElement](#)
- utilization : [ApexContractRestrictions](#)
- utilizationMode : [ApexInitParameters](#) , [ApexOperatorConfig](#)



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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- V -

- validationStatus : [ApexValidationInfo](#)
- validityEndDate : [ApexConfirmCancelInfo](#) , [ApexConfirmTransferInfo](#)
- validityStartDate : [ApexConfirmCancelInfo](#) , [ApexConfirmTransferInfo](#)
- validityStartTime : [ApexContractTemporalValidity](#)
- value : [ApexLoyaltyOperatorRecord](#)
- vatNumber : [ApexHolderId](#) , [ApexPaymentInfo](#)
- vehicleId : [ApexControlServiceLocation](#) , [ApexEvent](#) , [ApexServiceLocation](#)
- via : [ApexMatrixElement](#)
- viaZoneName : [ApexProductSpatialValidityChoice](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- W -

- whitelistItemId : [ApexWhitelistCardElement](#) , [ApexWhitelistProfileElement](#)
- whitelistStatus : [ApexControlOutputData](#)
- witnessDocumentType : [ApexControlFine](#)
- witnessIdentityNumber : [ApexControlFine](#)
- workingMode : [ApexCardSamAssociation](#)

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Here is a list of all struct and union fields with links to the structures/unions they belong to:

- Z -

- zoneChoiceArray : [ApexProductParameter](#)
- zoneChoiceCount : [ApexProductParameter](#)
- zoneChoiceNumberOfSelections : [ApexProductParameter](#)
- zoneId : [ApexProductZoneChoice](#) , [ApexZone](#)
- zoneIdArray : [ApexSpatialValidityData](#)
- zoneName : [ApexProductZoneChoice](#) , [ApexZone](#)
- zonesCount : [ApexSpatialValidityData](#)
- zonesNumberFromStart : [ApexSpatialValidity](#)

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- a -

- actionListsFullFilename : **ApexCheckConfigFilesInputParameters** , **ApexInitParameters**
- allowsReloadFlag : **ApexContract**
- antennaNumber : **ApexCardReaderConfig**
- antipassbackMode : **ApexWhitelistCardElement** , **ApexWhitelistProfileElement**
- apexDetailedStatus : **ApexLastError**
- apexMinVersion : **ApexFileHeaderInfo**
- apexStatus : **ApexLastError**
- apiApexVersion : **ApexVersion**
- apiVivaVersion : **ApexVersion**
- applicationIssuerCode : **ApexEnvironment**
- applicationIssuerId : **ApexEnvironment**
- applicationIssuerName : **ApexEnvironment**
- applicationIssuerShortName : **ApexEnvironment**
- attachedDocumentName : **ApexControlFine**
- attachedDocumentObs : **ApexControlFine**
- attachedDocumentType : **ApexControlFine**
- authorizationId : **ApexGreenlistElement**
- autoIncreaseFlag : **ApexPerformanceConfig**
- availableZonesArray : **ApexSpatialValidity**
- availableZonesCount : **ApexSpatialValidity**

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- b -

- binaryData : **ApexBinary**
 - binaryDataSize : **ApexBinary**
 - blockId : **ApexControlServiceLocation ,**
ApexServiceLocation
-

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- C -

- cacheOptimizationFlag : **ApexConfigureProductParameters** ,
ApexGetCatalogParameters ,
ApexGreenlistLoadParameters
- calypsoNativeMode : **ApexCardReaderConfig**
- capacity : **ApexPerformanceConfig**
- cardBlacklistItemId : **ApexBlacklistCardElement**
- cardData : **ApexControlOutputData** ,
ApexReadCardOutputData
- cardDataExtra : **ApexReadCardOutputData**
- cardDataModel : **ApexCardInfo** , **ApexGreylistElement**
- cardFamily : **ApexCardDetectedInfo**
- cardFilterFlag : **ApexGetCatalogParameters**
- cardInBlacklistFlag : **ApexReadCardOutputData**
- cardInfo : **ApexCardDetectedInfo** , **ApexControlOutputData** ,
ApexReadCardOutputData
- cardInfoLength : **ApexCardDetectedInfo**
- cardIssuer : **ApexDamagedCardInfo**
- cardNumber : **ApexDamagedCardInfo** , **ApexEnvironment**
- cardPhysicalType : **ApexCardDetectedInfo** , **ApexCardInfo**
- cardReaderId : **ApexCardSamAssociation**
- cardSerialNumber : **ApexBlacklistCardElement** ,
ApexCardDetectedInfo , **ApexCardInfo** ,
ApexDamagedCardInfo , **ApexGreenlistElement** ,
ApexGreylistElement , **ApexWhitelistCardElement**
- cardTypeld : **ApexBlacklistCardElement** , **ApexCardInfo** ,
ApexConfigureProductParameters , **ApexDamagedCardInfo** ,
ApexGreenlistElement , **ApexGreylistElement** ,
ApexTransferParameters , **ApexWhitelistCardElement**

- cardTypeIdsArray : **ApexCatalogProduct**
- cardTypeIdsCount : **ApexCatalogProduct**
- cardValidityState : **ApexCardDetectedInfo , ApexCardInfo**
- catalogProductsArray : **ApexCatalog**
- catalogProductsCount : **ApexCatalog**
- catalogTransferParameters : **ApexTransferParameters**
- channelId : **ApexCheckConfigFilesInputParameters , ApexInitParameters , ApexOperatorConfig**
- characteristics : **ApexContract**
- civilNumber : **ApexHolderId**
- clientLevel : **ApexLoyaltyOperatorData**
- comOfferFullFilename :

 ApexCheckConfigFilesInputParameters , ApexInitParameters
- configId : **ApexProductParameter**
- configurationId : **ApexCatalogTransferParameters , ApexPreSelectionConfiguration , ApexPreSelectionParameters , ApexProductConfiguration**
- configureMode : **ApexConfigureProductParameters**
- contractBinariesArray : **ApexCardBinaries**
- contractBinary : **ApexConfigureProductParameters**
- contractCount : **ApexReadTransferParameters**
- contractDuration : **ApexContractTemporalValidity**
- contractDurationType : **ApexContractTemporalValidity**
- contractInGreylistFlag : **ApexContract**
- contractNumber :

 ApexCancelParameters , ApexConfigurePreSelectionParameters , ApexContract , ApexEventContractUsage , ApexReadTransferParameters , ApexTransferParameters
- contractsArray : **ApexCardData**
- contractsCount : **ApexCardData**
- contractsInGreenlistFlag :

 ApexControlOutputData , ApexReadCardOutputData
- contractStartDate : **ApexGreenlistElement**
- contractStatus : **ApexGetInfractionsInputParameters**
- contractStatusArray : **ApexControlOutputData**
- contractStatusCount : **ApexControlOutputData**
- contractStatusMask : **ApexInfraction**
- contractsUsedMask :

 ApexEvent , ApexParkData

- contractUnits : **ApexContract**
 - controllerDocumentType : **ApexControlFine**
 - controllerIdentityNumber : **ApexControlFine**
 - controlStatus : **ApexControlOutputData**
 - corrCardIssuer : **ApexCatalogTransferParameters**
 - corrCardNumber : **ApexCatalogTransferParameters**
 - corrCardSerialNumber : **ApexCatalogTransferParameters**
 - corrCardTypeId : **ApexCatalogTransferParameters**
 - countryCode : **ApexEnvironment**
 - couplerConfiguration : **ApexCardReaderConfig , ApexSamReaderConfig**
 - cscType : **ApexCardReaderConfig , ApexSamReaderConfig**
 - currencyCode : **ApexEnvironment**
-

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- d -

- dailyUsageRate : **ApexContractCharacteristics**
- dailyUsageRateFlag : **ApexCancelParameters**
- dailyUsageValue : **ApexConfirmCancelInfo**
- dateJsonValue : **ApexProductParameter**
- decrementedUnits : **ApexValidationInfo**
- description : **ApexFine** , **ApexFineAttribute** , **ApexInfraction** ,
ApexInfractionAttribute , **ApexProductCategory**
- destinationStopId : **ApexControlServiceLocation**
- destinationZone : **ApexMatrixElement**
- destinationZoneId : **ApexEvent**
- destinationZoneName : **ApexProductSpatialValidityChoice**
- destinationZonesArray : **ApexPreSelectionConfiguration**
- destinationZonesCount : **ApexPreSelectionConfiguration**
- destinationZoneSelectedIndex :
ApexPreSelectionConfiguration
- deviceId : **ApexEvent** , **ApexInitParameters** ,
ApexOperatorConfig , **ApexParkData**
- dutyId : **ApexControlServiceLocation** , **ApexServiceLocation**

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- e -

- endDate : **ApexBlacklistSamElement , ApexCardProfile , ApexEnvironment , ApexLoyaltyOperatorRecord , ApexWhitelistCardElement , ApexWhitelistProfileElement**
- environment : **ApexCardData**
- environmentBinary : **ApexCardBinaries**
- environmentStatus : **ApexControlOutputData , ApexGetInfringementsInputParameters**
- environmentStatusMask : **ApexInfraction**
- errorType : **ApexLowLevelError**
- event : **ApexCardData**
- eventBinary : **ApexCardBinaries**
- eventContractUsageArray : **ApexEvent , ApexParkData**
- eventContractUsageCount : **ApexEvent , ApexParkData**
- eventDateTime : **ApexEvent , ApexParkData**
- eventOperatorId : **ApexEvent , ApexParkData**
- eventType : **ApexConfirmValidationInfo , ApexEvent , ApexParkData**
- exitDateLimit : **ApexParkData**
- exitTimeLimit : **ApexParkData**
- expirationDate : **ApexPaperTicketData**
- externalLogger : **ApexLogConfig**
- extraJourneyId : **ApexControlServiceLocation , ApexServiceLocation**

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- f -

- fileDate : **ApexFileInfo**
- fileEndDate : **ApexFileInfo**
- fileFormatVersion : **ApexFileInfo**
- fileStartDate : **ApexFileInfo**
- fileVersion : **ApexFileInfo**
- finalDateTime : **ApexTripDuration**
- fineAmount : **ApexControlFine**
- fineAttributId : **ApexGetFinesInputParameters**
- fineAttributesArray : **ApexFine , ApexFineAttributes**
- fineAttributesCount : **ApexFine , ApexFineAttributes**
- fineId : **ApexControlFine**
- fineOperatorId : **ApexControlFine**
- finesArray : **ApexFines**
- finesCount : **ApexFines**
- firstDateTime : **ApexEventContractUsage**
- fullFileName : **ApexLogConfig , ApexPerformanceConfig**

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- g -

- graphicalLayout : **ApexEnvironment**
 - greenlistItemId : **ApexGreenlistElement**
 - greylistItemId : **ApexGreylistElement**
 - groupDimension : **ApexContractCharacteristics** ,
ApexProductSalesPackage ,
ApexProductSalesPackageChoice
 - groupFlag : **ApexCatalogProduct**
-

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- h -

- hasCardDataModel : **ApexGreylistElement**
- hasEndDate : **ApexBlacklistSamElement** ,
ApexWhitelistCardElement , **ApexWhitelistProfileElement**
- hasLoadDate : **ApexGreylistElement**
- hasLoadSequenceNumber : **ApexGreylistElement**
- hasMachineCode : **ApexGreylistElement**
- hasPhysicalSupport : **ApexProductConfiguration**
- hasStartDate : **ApexBlacklistSamElement**
- holderBirthDate : **ApexEnvironment**
- holderCompany : **ApexEnvironment**
- holderCompanyName : **ApexEnvironment**
- holderCompanyShortName : **ApexEnvironment**
- holderId : **ApexCardData**
- holderIdBinary : **ApexCardBinaries**
- holderNumber : **ApexEnvironment**

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- i -

- id : **ApexCardReaderConfig , ApexCardTypeId , ApexFine , ApexFineAttribute , ApexInfraction , ApexInfractionAttribute , ApexSamReaderConfig**
- includePatternsFlag : **ApexGetLinesInputParameters**
- includeStopsFlag : **ApexGetLinesInputParameters**
- infractionAttributId : **ApexGetInfractionsInputParameters**
- infractionAttributesArray : **ApexInfraction , ApexInfractionAttributes**
- infractionAttributesCount : **ApexInfraction , ApexInfractionAttributes**
- infractionDate : **ApexControlFine**
- infractionDescription : **ApexControlFine**
- infractionId : **ApexControlFine , ApexGetFinesInputParameters**
- infractionNoticeDate : **ApexControlFine**
- infractionNumber : **ApexControlFine**
- infractionPlace : **ApexControlFine**
- infractionsArray : **ApexFine , ApexInfractions**
- infractionsCount : **ApexFine , ApexInfractions**
- initialDateTime : **ApexTripDuration**
- interchangeAllowedFlag : **ApexContract**
- invoiceNumber : **ApexPaymentInfo**
- isODPreSelectionFlag :
ApexConfigurePreSelectionParameters , ApexPreSelectionConfiguration
- isSelectedFlag : **ApexProductSalesPackageChoice , ApexProductSpatialValidityChoice , ApexProductZoneChoice**

- issueEnvironment : **ApexIssueData**
 - issueHolderId : **ApexIssueData**
 - issueMode : **ApexIssueData**
 - issuerData : **ApexEnvironment , ApexEvent , ApexHolderId**
 - issuerAxisSize : **ApexEnvironment , ApexEvent , ApexHolderId**
 - issuingDate : **ApexEnvironment**
 - isValid : **ApexPreSelectionConfiguration**
-

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- j -

- journeyId : **ApexControlServiceLocation** ,
ApexServiceLocation
 - journeyInterchanges : **ApexEvent**
-

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- k -

- kvc : ApexCardDetectedInfo
-

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- | -

- level : **ApexProductCategory**
- line : **ApexMatrixElement**
- lineId : **ApexControlServiceLocation , ApexEvent , ApexGetLinesInputParameters , ApexLine , ApexLineInfo , ApexServiceLocation**
- lineInfoArray : **ApexLinesInfo**
- lineInfoCount : **ApexLinesInfo**
- lineName : **ApexLine , ApexLineInfo , ApexPaperTicketData , ApexProductSpatialValidityChoice**
- loadDate : **ApexGreylistElement**
- loadEndDate : **ApexLoyaltyOperatorRecord**
- loadSequenceNumber : **ApexGreylistElement**
- locationFilterFlag : **ApexGetCatalogParameters**
- locationId : **ApexParkData**
- logLevel : **ApexLogConfig**
- logType : **ApexLogConfig**
- lowLevelError : **ApexLastError**
- loyaltyBinariesArray : **ApexCardBinaries**
- loyaltyDataNumber : **ApexLoyaltyData**
- loyaltyOperator : **ApexLoyaltyOperatorData**
- loyaltyRecordsArray : **ApexCardDataExtra**
- loyaltyRecordsCount : **ApexCardDataExtra**

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- m -

- machineCode : **ApexGreylistElement** , **ApexInitParameters** , **ApexOperatorConfig**
- materializationType : **ApexCatalogProduct** , **ApexContractCharacteristics**
- matrixElementId : **ApexSpatialValidityData**
- matrixElementsArray : **ApexSpatialValidity**
- matrixElementsCount : **ApexSpatialValidity**
- maxAmount : **ApexFine**
- maxContractBinaries : **ApexCardBinaries**
- maxContracts : **ApexCardData**
- maxDailyUsage : **ApexContractRestrictions**
- maxLoyaltyBinaries : **ApexCardBinaries**
- mediaType : **ApexEnvironment**
- minAmount : **ApexFine**

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- n -

- name : **ApexHolderId**
- networkFullFilename :
ApexCheckConfigFilesInputParameters ,
ApexInitParameters
- networkId : **ApexContract** , **ApexEnvironment** , **ApexEvent** ,
ApexParkData
- numDailyFilePath : **ApexInitParameters** ,
ApexOperatorConfig
- numDailyMaxValue : **ApexInitParameters** ,
ApexOperatorConfig
- numDailyMinValue : **ApexInitParameters** ,
ApexOperatorConfig
- numValue : **ApexProductParameter**
- numValue64 : **ApexProductParameter**

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- O -

- offenderAddress : **ApexControlFine**
- offenderBirthDate : **ApexControlFine**
- offenderDocumentType : **ApexControlFine**
- offenderIdentityNumber : **ApexControlFine**
- offenderName : **ApexControlFine**
- offenderPostalCode : **ApexControlFine**
- offenderVatNumber : **ApexControlFine**
- onlineCheckFlag : **ApexGreenlistElement**
- operationPlanId : **ApexControlServiceLocation , ApexServiceLocation**
- operationsAllowed : **ApexCatalogProduct**
- operatordataArray : **ApexLoyaltyData**
- operatorDataCount : **ApexLoyaltyData**
- operatorId : **ApexCheckConfigFilesInputParameters , ApexInitParameters , ApexOperator , ApexOperatorConfig**
- operatorName : **ApexOperator , ApexPaperTicketData**
- operatorsArray : **ApexSpatialValidity**
- operatorsCount : **ApexSpatialValidity**
- operatorShortName : **ApexOperator , ApexPaperTicketData**
- originStopId : **ApexControlServiceLocation**
- originZone : **ApexMatrixElement**
- originZoneId : **ApexEvent**
- originZoneName : **ApexProductSpatialValidityChoice**
- originZonesArray : **ApexPreSelectionConfiguration**
- originZonesCount : **ApexPreSelectionConfiguration**
- originZoneSelectedIndex : **ApexPreSelectionConfiguration**
- outOfBoundsType : **ApexServiceLocation**

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- p -

- parameterArray : **ApexProductConfiguration**
- parameterCount : **ApexProductConfiguration**
- parkBinary : **ApexCardBinaries**
- parkData : **ApexCardDataExtra**
- pattern : **ApexMatrixElement**
- patternId : **ApexControlServiceLocation , ApexEvent , ApexGetLinesInputParameters , ApexPattern , ApexPatternInfo , ApexServiceLocation**
- patternInfoArray : **ApexLineInfo**
- patternInfoCount : **ApexLineInfo**
- patternName : **ApexPaperTicketData , ApexPattern , ApexPatternInfo**
- paymentInfo : **ApexCancelParameters**
- paymentMethod : **ApexPaymentInfo**
- periodRemainingTrips : **ApexEventContractUsage**
- periodStart : **ApexEventContractUsage**
- personalizationId : **ApexGreenlistElement**
- physicalSupport : **ApexProductConfiguration**
- preSelectionMode : **ApexPreSelectionParameters**
- preSelectionODType : **ApexContractCharacteristics**
- preSelectionType : **ApexContractCharacteristics**
- preValidationStatus : **ApexContract**
- price : **ApexCancelParameters , ApexConfirmCancellInfo , ApexPaperTicketData , ApexPhysicalSupport , ApexProductConfiguration , ApexProductSalesPackage , ApexProductSalesPackageChoice**
- priceAmount : **ApexParkData**
- procedure : **ApexInfraction**

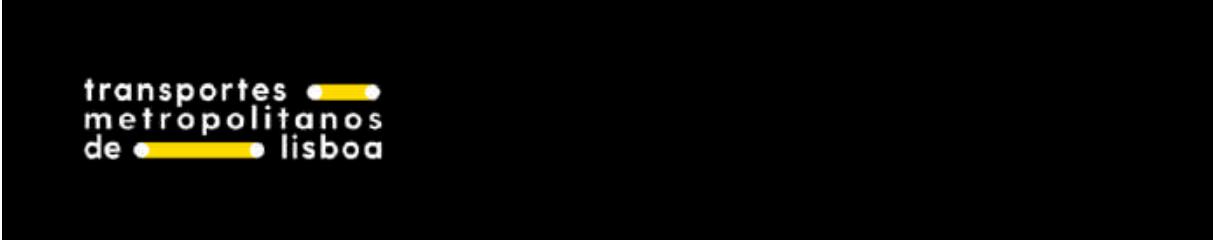
- productCategoriesArray : **ApexCatalogProduct**
- productCategoriesCount : **ApexCatalogProduct**
- productExpirationDate : **ApexValidationInfo**
- productHasExpirationDate : **ApexValidationInfo**
- productId : **ApexCatalogProduct** ,
ApexConfigureProductParameters ,
ApexConfirmCancelInfo , **ApexConfirmTransferInfo** ,
ApexConfirmValidationInfo , **ApexContract** ,
ApexPhysicalSupport , **ApexValidationInfo**
- productLongId : **ApexGreenlistElement** ,
ApexGreylistElement , **ApexWhitelistCardElement** ,
ApexWhitelistProfileElement
- productName : **ApexCatalogProduct** ,
ApexConfirmCancelInfo , **ApexConfirmTransferInfo** ,
ApexConfirmValidationInfo , **ApexContract** ,
ApexPhysicalSupport , **ApexValidationInfo**
- productQuantity : **ApexCancelParameters**
- profileCombinationsArray : **ApexCatalogProduct**
- profileCombinationsCount : **ApexCatalogProduct**
- profileId : **ApexCardProfile** , **ApexProfile**
- profileName : **ApexCardProfile** , **ApexProfile**
- profileNumber : **ApexCardProfile**
- profilesArray : **ApexConfirmValidationInfo** ,
ApexEnvironment , **ApexProfileCombination** ,
ApexValidationInfo
- profilesCount : **ApexConfirmValidationInfo** ,
ApexEnvironment , **ApexProfileCombination** ,
ApexValidationInfo
- profilesUsedMask : **ApexEvent** , **ApexParkData**
- profileValidationFlag : **ApexConfirmValidationInfo**
- promptAmount : **ApexFine**

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- r -

- readerAddress : **ApexCardReaderConfig , ApexSamReaderConfig**
- readHolderIdFlag : **ApexReadCardInputParameters**
- readLoyaltyDataFlag : **ApexReadCardInputParameters**
- readParkDataFlag : **ApexReadCardInputParameters**
- readTransferParameters : **ApexTransferParameters**
- recordsArray : **ApexLoyaltyOperatorData**
- recordsCount : **ApexLoyaltyOperatorData**
- rehabilitationDate : **ApexEnvironment**
- remainingUnits : **ApexValidationInfo**
- requiredContractNumber : **ApexContract**
- restrictions : **ApexContract**
- restrictTime : **ApexContract**
- rightExtensionType : **ApexCatalogProduct , ApexContractCharacteristics**

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- S -

- saleCount : **ApexContract**
- saleDate : **ApexConfirmCancelInfo** ,
ApexConfirmTransferInfo , **ApexContract** ,
ApexPaperTicketData
- saleOperator : **ApexContract**
- saleSamMachineId : **ApexContract**
- salesPackageChoiceArray : **ApexProductParameter**
- salesPackageChoiceCount : **ApexProductParameter**
- salesPackageID : **ApexCancelParameters**
- salesPackageld : **ApexGreenlistElement** ,
ApexPhysicalSupport , **ApexProductSalesPackage** ,
ApexProductSalesPackageChoice
- salesPackagesArray : **ApexCatalogProduct**
- salesPackagesCount : **ApexCatalogProduct**
- samAtr : **ApexSamReaderConfig**
- samAtrLen : **ApexSamReaderConfig**
- samBlacklistItemId : **ApexBlacklistSamElement**
- samInBlacklistFlag : **ApexContract** ,
ApexReadCardOutputData
- samReaderId : **ApexCardSamAssociation**
- samSerialNumber : **ApexBlacklistSamElement**
- samTypeId : **ApexBlacklistSamElement** ,
ApexSamReaderConfig
- searchMode : **ApexCardReaderConfig**
- securityData : **ApexPaperSaleAckParameters** ,
ApexPaperTicketData
- slotNumber : **ApexSamReaderConfig**

- spatialValiditiesArray : **ApexContract** , **ApexGreenlistElement** , **ApexWhitelistCardElement** , **ApexWhitelistProfileElement**
- spatialValiditiesCount : **ApexContract** , **ApexGreenlistElement** , **ApexWhitelistCardElement** , **ApexWhitelistProfileElement**
- spatialValidityChoiceArray : **ApexProductParameter**
- spatialValidityChoiceCount : **ApexProductParameter**
- spatialValidityId : **ApexProductSpatialValidityChoice** , **ApexSpatialValidityData**
- startDate : **ApexBlacklistSamElement** , **ApexCardProfile** , **ApexLoyaltyOperatorRecord** , **ApexWhitelistCardElement** , **ApexWhitelistProfileElement**
- status : **ApexProductConfiguration**
- status1 : **ApexLowLevelError**
- status2 : **ApexLowLevelError**
- stop : **ApexMatrixElement**
- stopId : **ApexEvent** , **ApexServiceLocation** , **ApexStop** , **ApexStopInfo**
- stopInfoArray : **ApexPatternInfo**
- stopInfoCount : **ApexPatternInfo**
- stopName : **ApexPaperTicketData** , **ApexStop** , **ApexStopInfo**

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- t -

- taxPercentage : **ApexPaperTicketData** ,
ApexPhysicalSupport , **ApexProductSalesPackage** ,
ApexProductSalesPackageChoice
- taxValue : **ApexPhysicalSupport** ,
ApexProductSalesPackage ,
ApexProductSalesPackageChoice
- techParamsFullFilename :
ApexCheckConfigFilesInputParameters ,
ApexInitParameters
- temporalUnits : **ApexConfirmCancelInfo**
- temporalUnitsType : **ApexConfirmCancelInfo**
- temporalValidity : **ApexContract**
- textValue : **ApexProductParameter**
- ticketNumber : **ApexPaperSaleAckParameters** ,
ApexPaperTicketData
- timeBetweenPassengers : **ApexContractCharacteristics**
- transactionId : **ApexControlOutputData**
- transferMode : **ApexTransferParameters**
- tripClass : **ApexContractCharacteristics**
- tripDuration : **ApexContractTemporalValidity** ,
ApexValidationInfo
- tripDurationType : **ApexContractTemporalValidity**
- type : **ApexProductParameter**

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- U -

- units : **ApexConfirmCancelInfo** , **ApexConfirmTransferInfo**
- unitsNumber : **ApexProductSalesPackage** ,
ApexProductSalesPackageChoice
- unitsQuantity : **ApexCancelParameters**
- unitsToDebit : **ApexConfirmValidationInfo**
- unitType : **ApexConfirmCancelInfo** ,
ApexConfirmTransferInfo , **ApexContractCharacteristics** ,
ApexValidationInfo
- usageData : **ApexEventContractUsage**
- usageDays : **ApexCancelParameters**
- usedProfilesCount : **ApexWhitelistProfileElement**
- usedProfilesIdArray : **ApexWhitelistProfileElement**
- utilization : **ApexContractRestrictions**
- utilizationMode : **ApexInitParameters** , **ApexOperatorConfig**

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- V -

- validationStatus : **ApexValidationInfo**
- validityEndDate : **ApexConfirmCancelInfo** ,
ApexConfirmTransferInfo
- validityStartDate : **ApexConfirmCancelInfo** ,
ApexConfirmTransferInfo
- validityStartTime : **ApexContractTemporalValidity**
- value : **ApexLoyaltyOperatorRecord**
- vatNumber : **ApexHolderId** , **ApexPaymentInfo**
- vehicleId : **ApexControlServiceLocation** , **ApexEvent** ,
ApexServiceLocation
- via : **ApexMatrixElement**
- viaZoneName : **ApexProductSpatialValidityChoice**

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- W -

- whitelistItemId : **ApexWhitelistCardElement** ,
ApexWhitelistProfileElement
 - whitelistStatus : **ApexControlOutputData**
 - witnessDocumentType : **ApexControlFine**
 - witnessIdentityNumber : **ApexControlFine**
 - workingMode : **ApexCardSamAssociation**
-

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- Z -

- zoneChoiceArray : **ApexProductParameter**
- zoneChoiceCount : **ApexProductParameter**
- zoneChoiceNumberOfSelections : **ApexProductParameter**
- zoneId : **ApexProductZoneChoice , ApexZone**
- zoneIdArray : **ApexSpatialValidityData**
- zoneName : **ApexProductZoneChoice , ApexZone**
- zonesCount : **ApexSpatialValidityData**
- zonesNumberFromStart : **ApexSpatialValidity**

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File List

Here is a list of all files with brief descriptions:

[apex.h](#)

[apexGlb.h](#)

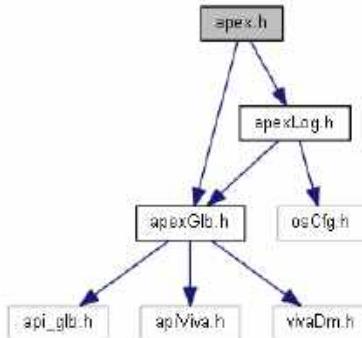
[apexLog.h](#)

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apex.h File Reference

```
#include "apexGlb.h" #include "apexLog.h"
```

Include dependency graph for apex.h:



[Go to the source code of this file.](#)

Data Structures

struct [ApexVersion](#)

Describes the API-APEX version data structure. [More...](#)

struct [ApexCardSamAssociation](#)

Structure identifying which card and SAM readers are to be associated and how this association should be interpreted. [More...](#)

struct [ApexReadCardOutputData](#)

Structure containing all data read from a card. [More...](#)

struct [ApexReadCardInputParameters](#)

Structure containing all parameters required to run a card read operation. [More...](#)

struct [ApexServiceLocation](#)

Service location context. [More...](#)

struct [ApexControlServiceLocation](#)

Control service location context. [More...](#)

struct [ApexGreenlistLoadParameters](#)

Greenlist load input parameters. [More...](#)

struct [ApexPerformanceConfig](#)

Performance configuration. [More...](#)

struct **ApexCatalogTransferParameters**

Structure containing the required parameters to perform a contract transferral from a configured catalog product. [More...](#)

struct **ApexReadTransferParameters**

Structure containing the required parameters to perform a contract transferral from a card. [More...](#)

struct **ApexTransferParameters**

Structure containing the input parameters for each of the transfer modes. [More...](#)

struct **ApexCatalog**

Products catalog. [More...](#)

struct **ApexCancelParameters**

Structure containing the required parameters to cancel part or the totality of a loaded ticket. [More...](#)

struct **ApexPaperSaleAckParameters**

Input parameters of the **ApexPaperSaleAck()** function. [More...](#)

struct **ApexPreSelectionParameters**

Pre-selection confirmation parameters. [More...](#)

struct **ApexInfractionAttributes**

Infraction attributes array. [More...](#)

struct **ApexInfractions**

Infractions array. [More...](#)

struct **ApexFineAttributes**

Fine attributes array. [More...](#)

struct **ApexFines**

Fines array. [More...](#)

Macros

#define **K_APEX_MAX_CARD_READERS** K_MAX_CARD_READERS

Maximum number of card readers that can be added. [More...](#)

#define **K_APEX_MAX_SAM_READERS** K_MAX_SAM_READERS

Maximum number of SAM readers that can be added. [More...](#)

Enumerations

enum **ApexContextParamId** {

APEX_CONTEXT_PARAM_ID_LOGGER_CONFIG = 0x00,
APEX_CONTEXT_PARAM_ID_SERVICE_LOCATION = 0x02,
APEX_CONTEXT_PARAM_ID_SET_EXTERNAL_CARD = 0x03,
APEX_CONTEXT_PARAM_ID_SET_CARD_TYPE_ID = 0x04,
APEX_CONTEXT_PARAM_ID_PERFORMANCE_CONFIG = 0x05,

```
APEX_CONTEXT_PARAM_ID_CONTROL_SERVICE_LOCATION = 0x06,  
APEX_CONTEXT_PARAM_ID_CONFIG_MODE = 0x07,  
APEX_CONTEXT_PARAM_ID_CONFIG_OPERATOR = 0x08,  
APEX_CONTEXT_PARAM_ID_ACCESS_KEY = 0x09,  
APEX_CONTEXT_PARAM_ID_MAX_VALUE = 0xA  
}
```

Identifies which part of the context is being referred to. [More...](#)

```
enum ApexCallbackId {  
    APEX_CALLBACK_ID_UNDEFINED = 0x00,  
    APEX_CALLBACK_ID_TRANSACTION_REPORT = 0x01,  
    APEX_CALLBACK_ID_CONFIRM_VALIDATION = 0x02,  
    APEX_CALLBACK_ID_POST_VALIDATION = 0x03,  
    APEX_CALLBACK_ID_CONFIRM_TRANSFER = 0x04,  
    APEX_CALLBACK_ID_CONFIRM_CANCEL = 0x05,  
    APEX_CALLBACK_ID_LOAD_SEQUENCE = 0x06, APEX_CALLBACK_ID_WEB_SERVICE  
= 0x07,  
    APEX_CALLBACK_ID_CHECK_BLACKLIST_CARD = 0x08,  
    APEX_CALLBACK_ID_CHECK_BLACKLIST_SAM = 0x09,  
    APEX_CALLBACK_ID_CHECK_GREYLIST = 0x0A,  
    APEX_CALLBACK_ID_CHECK_WHITELIST_PROFILE = 0x0B,  
    APEX_CALLBACK_ID_CHECK_WHITELIST_CARD = 0x0C,  
    APEX_CALLBACK_ID_CHECK_GREENLIST = 0x0D, APEX_CALLBACK_ID_MAX_VALUE  
= 0xE  
}
```

Identifies which callback is being referred to. [More...](#)

```
enum ApexDataTypeId {  
    APEX_DATA_TYPE_ID_UNDEFINED = 0x00,  
    APEX_DATA_TYPE_ID_READ_CARD_OUTPUT_DATA = 0x01,  
    APEX_DATA_TYPE_ID_CONTROL_OUTPUT_DATA = 0x02,  
    APEX_DATA_TYPE_ID_DECODED_TRANSACTION = 0x03,  
    APEX_DATA_TYPE_ID_LINES_INFO = 0x04, APEX_DATA_TYPE_ID_MAX_VALUE = 0x05  
}
```

Identifies the type of data being referred. [More...](#)

```
enum ApexTransferMode { APEX_TRANSFER_MODE_READ = 0x00,  
APEX_TRANSFER_MODE_LOAD_FROM_CARD = 0x01,  
APEX_TRANSFER_MODE_LOAD_FROM_CATALOG = 0x02,  
APEX_TRANSFER_MODE_MAX_VALUE = 0x03 }
```

Contract transfer mode. [More...](#)

```
enum ApexPaperSaleAckMode { APEX_PAPER_SALE_ACK_MODE_TICKET_DATA_READ =  
0x00, APEX_PAPER_SALE_ACK_MODE_LAST_SALE = 0x01,  
APEX_PAPER_SALE_ACK_MODE_MANUAL_INPUT = 0x02,  
APEX_PAPER_SALE_ACK_MODE_MAX_VALUE = 0x03 }
```

Mode of operation of the `ApexPaperSaleAck()` function. [More...](#)

```
enum ApexPreSelectionMode { APEX_PRE_SELECTION_MODE_ON_MEMORY = 0x00,  
APEX_PRE_SELECTION_MODE_ON_CARD = 0x01,  
APEX_PRE_SELECTION_MODE_MAX_VALUE = 0x02 }
```

Dictates where the pre-selection data is written. [More...](#)

Functions

EXPORT ApexStatus CALL_CONVENTION Apex (void **outApexContext)	Creates the API-APEX Context. More...
EXPORT ApexStatus CALL_CONVENTION ApexDestroy (void **inApexContext)	Frees all memory allocated to API-APEX. More...
EXPORT ApexStatus CALL_CONVENTION ApexInit (void *inApexContext, ApexInitParameters *inlr)	Initializes the API-APEX Context. More...
EXPORT ApexStatus CALL_CONVENTION ApexEnd (void *inApexContext)	Closes and frees all resources initialized during since the ApexInit() . More...
EXPORT ApexStatus CALL_CONVENTION ApexGetLibVersion (void *inApexContext, ApexVersion)	Fetches both the API-APEX and API VIVA versions current.
EXPORT ApexStatus CALL_CONVENTION ApexGetFileInfo (void *inApexContext, T_S8 inFullFilename[K_APEX_FILE_PATH_MAX_SIZE], Apex *outFileInfo)	Fetches the common data from the configuration file's header.
EXPORT ApexStatus CALL_CONVENTION ApexCheckConfigFiles (void *inApexContext, ApexCheckConfigFilesInputParameters *inputParameters)	Tests the input configuration files. More...
EXPORT ApexStatus CALL_CONVENTION ApexSetContext (void *inApexContext, ApexContextParameters *inParamConfig)	Changes or sets the operational context for the specified parameter. More...
EXPORT ApexStatus CALL_CONVENTION ApexSetCallback (void *inApexContext, ApexCallbackInfo void *inCallbackPtr, void *inCallbackContext)	Changes or sets a specified API-APEX callback. More...
EXPORT ApexStatus CALL_CONVENTION ApexGetDetailedStatus (void *inApexContext, ApexLastError *outLastError)	Fetches API-APEX error details. More...
EXPORT ApexStatus CALL_CONVENTION ApexRead (void *inApexContext, ApexReadCardInputParameters *inputParameters, ApexReadCardOutputData *outCardOutputData)	Reads the current card data. In case of a multi-application operation is performed over the currently selected application.
EXPORT ApexStatus CALL_CONVENTION ApexGetCardBinaries (void *inApexContext, ApexCardInfo *outCardBinaries)	Returns the card's binary data. More...
EXPORT ApexStatus CALL_CONVENTION ApexCleanCache (void *inApexContext)	Frees non essential memory. More...
EXPORT ApexStatus CALL_CONVENTION ApexFreeData (void *inApexContext, ApexDataTypeId typeId, void *inData)	Frees dinamically allocated memory for a given data type.

EXPORT ApexStatus CALL_CONVENTION	ApexValidate (void *inApexContext) Validates a card using a contract or profile, taking into account location. More...
EXPORT ApexStatus CALL_CONVENTION	ApexConfigurePreSelection (void *inApexContext, ApexConfigurePreSelectionParameters *inConfigurePreSelectionParameters, ApexPreSelection *inOutPreSelectionConfig) Configures a pre-selection for a given contract. This pre-selects the contract to be used during validation and may include the origin/destination zones. More...
EXPORT ApexStatus CALL_CONVENTION	ApexPreSelection (void *inApexContext, ApexPreSelectionParameters *inPreSelectionParameters) Writes the configured pre-selection on the card or on memory.
EXPORT ApexStatus CALL_CONVENTION	ApexGetInfractionAttributes (void *inApexContext, ApexInfractionAttributes *outInfractionAttributes) Allows the caller to get the infraction attributes configured. More...
EXPORT ApexStatus CALL_CONVENTION	ApexGetInfractions (void *inApexContext, ApexGetInfractionsInputParameters *inputParameters, ApexInfractions *outInfractions) Allows the caller to get the infractions for the specified parameters.
EXPORT ApexStatus CALL_CONVENTION	ApexGetFineAttributes (void *inApexContext, ApexFineAttributes *outFineAttributes) Allows the caller to get the fine attributes configured in AP.
EXPORT ApexStatus CALL_CONVENTION	ApexGetFines (void *inApexContext, ApexGetFinesInputParameters *inputParameters, ApexFines *outFines) Allows the caller to get the fines for the specified parameters.
EXPORT ApexStatus CALL_CONVENTION	ApexGetLines (void *inApexContext, ApexGetLinesInputParameters *inputParameters, ApexLinesInfo *outLinesInfo) Allows the caller to get the network lines for the specified parameters. More...
EXPORT ApexStatus CALL_CONVENTION	ApexControl (void *inApexContext, ApexControlOutputData *outControlOutputData) Controls a transport card, taking into account the current location.
EXPORT ApexStatus CALL_CONVENTION	ApexPaperControl (void *inApexContext, T_S8 inSecurityData[K_APEX_PAPER_TICKET_SECURITY_CODE], ApexControlOutputData *outControlOutputData) Controls an onboard ticket, taking into account the current location.
EXPORT ApexStatus CALL_CONVENTION	ApexControlAck (void *inApexContext, T_S8 inTransactionId[K_APEX_TRANSACTION_ID_MAX_SIZE], ApexControlStatus inControlStatus, ApexControlFine *inControlFine, ApexDamagedCardInfo *inDamagedCardInfo) Confirms a control operation. More...

EXPORT ApexStatus CALL_CONVENTION	ApexInvalidate (void *inApexContext) Invalidates a card. More...
EXPORT ApexStatus CALL_CONVENTION	ApexRehabilitate (void *inApexContext) Recovers a card from an invalid state. More...
EXPORT ApexStatus CALL_CONVENTION	ApexIssue (void *inApexContext, ApexIssueData *inIssueData) Personalizes or updates a card's personalization and rese code back to default. More...
EXPORT ApexStatus CALL_CONVENTION	ApexGetCatalog (void *inApexContext, ApexGetCatalogParameters *inGetCatalogParameters, ApexCatalog *outCatalog) Fetches the configured products catalog. More...
EXPORT ApexStatus CALL_CONVENTION	ApexConfigureProduct (void *inApexContext, ApexConfigureProductParameters *inConfigureProductParameters, ApexProductConfiguration *inOutProductConfig) Configures and prepares a product for sale and loading to the card. More...
EXPORT ApexStatus CALL_CONVENTION	ApexLoad (void *inApexContext, ApexPaymentInfo *inPaymentInfo, T_U8 inApexConfigurationId[K_APEX_CONFIGURATION_ID_MAX_SIZE]) Loads the pre-configured product into the card. More...
EXPORT ApexStatus CALL_CONVENTION	ApexGreenlistLoad (void *inApexContext, ApexGreenlistLoadParameters *inGreenlistLoadParameters) Forces the loading of the products present in the greenlist card. More...
EXPORT ApexStatus CALL_CONVENTION	ApexUndo (void *inApexContext, ApexPaymentInfo *inPaymentInfo, T_S8 inTransactionCsv[K_APEX_CSV_MAX_SIZE]) Annuls the last contract operation such as sale, load, trans fer or refund. A corresponding transaction is generated. More...
EXPORT ApexStatus CALL_CONVENTION	ApexTransfer (void *inApexContext, ApexTransferParameters *inTransferParameters) Transfer ticket from a card to another or from catalog prod uct. More...
EXPORT ApexStatus CALL_CONVENTION	ApexRemove (void *inApexContext, T_U8 inContractNumber) Removes a contract from a card. More...
EXPORT ApexStatus CALL_CONVENTION	ApexCancel (void *inApexContext, ApexCancelParameters *inCancelParameters) Cancels part of or the totality of a loaded ticket. More...
EXPORT ApexStatus CALL_CONVENTION	ApexPaperSale (void *inApexContext, T_S8 inProductId[K_APEX_PRODUCT_ID_MAX_SIZE], ApexPaymentInfo *inPaymentInfo, ApexPaperTicketData *outPaperTicketData) Fetches the required data to print an onboard ticket and g et the payment info. More...
EXPORT ApexStatus CALL_CONVENTION	ApexPaperSaleAck (void *inApexContext, ApexPaperSaleAckMode inPaperSaleAckMode, ApexPaperSaleAckParameters *inPaperSaleAckParameters)

		*inPaperSaleAckParameters) Confirms an onboard ticket sale and utilization. Generates transaction. More...
EXPORT ApexStatus CALL_CONVENTION	ApexVerify (void *inApexContext)	Attempts to finish and resolve an interrupted operation. More...
EXPORT ApexStatus CALL_CONVENTION	ApexTripRefund (void *inApexContext, T_S8 inValidationCsv[K_APEX_CSV_MAX_SIZE])	Function used to return the value discounted on a validation.
EXPORT ApexStatus CALL_CONVENTION	ApexAddCardReader (void *inApexContext, ApexCardReader *inCardReaderConfig)	Adds and initializes a card reader. More...
EXPORT ApexStatus CALL_CONVENTION	ApexRemoveCardReader (void *inApexContext, T_U8 inCardReaderHandle)	Removes an initialized card reader. More...
EXPORT ApexStatus CALL_CONVENTION	ApexAddSamReader (void *inApexContext, ApexSamReader *inSamReaderConfig, T_U32 *outSamSerialNumber)	Adds and initializes a SAM reader. More...
EXPORT ApexStatus CALL_CONVENTION	ApexRemoveSamReader (void *inApexContext, T_U8 inSamReaderHandle)	Removes an initialized SAM reader. More...
EXPORT ApexStatus CALL_CONVENTION	ApexAddCardSamAssociation (void *inApexContext, ApexCardSamAssociation *inCardSamAssociation)	Associates a previously added card reader to a previously initialized SAM reader. More...
EXPORT ApexStatus CALL_CONVENTION	ApexRemoveCardSamAssociation (void *inApexContext, T_U32 inCardSamAssociationHandle)	Removes the current card-SAM association. More...
EXPORT ApexStatus CALL_CONVENTION	ApexVerifyTransaction (void *inApexContext, T_S8 inTransactionCsv[K_APEX_CSV_MAX_SIZE])	Verifies the validity of the input transaction's signature. More...
EXPORT ApexStatus CALL_CONVENTION	ApexDecodeTransaction (void *inApexContext, T_S8 inTransactionCsv[K_APEX_CSV_MAX_SIZE], T_U32 *outTransactionJsonLength, T_S8 **outTransactionJson)	Decodes a transaction into a deserializable json string, to be sent to backend systems. More...

Macro Definition Documentation

◆ K_APEX_MAX_CARD_READERS

```
#define K_APEX_MAX_CARD_READERS K_MAX_CARD_READERS
```

Maximum number of card readers that can be added.

Summary External interface of the API Embarcada AML thread safe library (API-APEX).

Remarks **Preliminary Note:**

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Contents:

This document describes the external interface of the API Embarcada AML thread safe library (API-APEX) in a header file format (C language).

Author Hugo Bicho

João Rosa

Daniel Figueira

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See also

[ApexAddCardReader\(\)](#)

◆ K_APEX_MAX_SAM_READERS

```
#define K_APEX_MAX_SAM_READERS K_MAX_SAM_READERS
```

Maximum number of SAM readers that can be added.

See also

ApexAddSamReader()

Enumeration Type Documentation

◆ ApexCallbackId

enum [ApexCallbackId](#)

Identifies which callback is being referred to.

Enumerator	
APEX_CALLBACK_ID_UNDEFINED	Undefined callback.
APEX_CALLBACK_ID_TRANSACTION_REPORT	Mandatory callback to send transaction records.
APEX_CALLBACK_ID_CONFIRM_VALIDATION	Callback to confirm the validation execution.
APEX_CALLBACK_ID_POST_VALIDATION	Callback that provides information about the contract or the profile validation made.
APEX_CALLBACK_ID_CONFIRM_TRANSFER	Callback to confirm the contract transferral execution.
APEX_CALLBACK_ID_CONFIRM_CANCEL	Callback to confirm the contract cancellation.
APEX_CALLBACK_ID_LOAD_SEQUENCE	Callback to get the load sequence information. Used in a central server context.
APEX_CALLBACK_ID_WEB_SERVICE	Callback to get online access using a web service.
APEX_CALLBACK_ID_CHECK_BLACKLIST_CARD	Callback to check the card blacklist.
APEX_CALLBACK_ID_CHECK_BLACKLIST_SAM	Callback to check the SAM blacklist.
APEX_CALLBACK_ID_CHECK_GREYLIST	Callback to check the greylist.
APEX_CALLBACK_ID_CHECK_WHITELIST_PROFILE	Callback to check the whitelist for profiles.
APEX_CALLBACK_ID_CHECK_WHITELIST_CARD	Callback to check the whitelist for cards.
APEX_CALLBACK_ID_CHECK_GREENLIST	Callback to check the greenlist.
APEX_CALLBACK_ID_MAX_VALUE	Maximum enum value.

◆ ApexContextParamId

enum [ApexContextParamId](#)

Identifies which part of the context is being referred to.

See also

[ApexSetContext](#)

Enumerator	
APEX_CONTEXT_PARAM_ID_LOGGER_CONFIG	<p>Indicates a new logger configuration.</p> <p>This parameter uses an ApexLogConfig.</p> <p>See also ApexLogConfig</p>
APEX_CONTEXT_PARAM_ID_SERVICE_LOCATION	<p>Indicates a new blacklist - RFU.</p> <p>Indicates a new service location. It's a location within an operator's lines.</p> <p>ApexValidate() and ApexLoadPre</p>
APEX_CONTEXT_PARAM_ID_SET_EXTERNAL_CARD	<p>Defines the required data for a card external reader.</p> <p>This parameter uses an ApexCardDetectedInfo structure.</p> <p>Note In order to revert the last extended context or to revert to a normal card context, a null pointer should be used when ApexSetContext().</p> <p>See also ApexCardDetectedInfo</p>
APEX_CONTEXT_PARAM_ID_SET_CARD_TYPE_ID	<p>Forces the detection of a specific card type.</p> <p>This parameter uses a T_S8 <code>cardTypeId[K_APEX_CARD_TYPE_ID]</code>. This string should be a valid ID for a card type defined in the Technical Parameters file.</p> <p>Note In order to revert to a normal card type, a null pointer should be used when ApexSetContext().</p>
APEX_CONTEXT_PARAM_ID_PERFORMANCE_CONFIG	<p>Indicates a new performance configuration.</p> <p>This parameter uses an ApexPerformanceConfig structure.</p> <p>Note In order to stop and save the current performance configuration, a null pointer should be used when ApexSetContext(). Otherwise, it will be saved during the call to ApexPerformanceConfig::SetPerformanceConfig(). Setting the performance configuration more than once, will reset the previous data.</p> <p>See also ApexPerformanceConfig</p>

APEX_CONTEXT_PARAM_ID_CONTROL_SERVICE_LOCATION	Indicates a new control service location. Identify a stops interval within a line. Control will be performed. Requires ApexControl() .
APEX_CONTEXT_PARAM_ID_CONFIG_MODE	Indicates a new configuration mode. Set before ApexInit() for the changes.
APEX_CONTEXT_PARAM_ID_CONFIG_OPERATOR	Indicates a new current operator. The current operator during API API APEX_CONFIGURATION_MODE used.
APEX_CONTEXT_PARAM_ID_ACCESS_KEY	Indicates a key to unlock apex functions. This parameter uses a T_S8 key[K_APEX_ACCESS_KEY_MAX].
APEX_CONTEXT_PARAM_ID_MAX_VALUE	Maximum enum value.

◆ ApexDataTypeld

enum [ApexDataTypeld](#)

Identifies the type of data being referred.

Enumerator	
APEX_DATA_TYPE_ID_UNDEFINED	Undefined data type.
APEX_DATA_TYPE_ID_READ_CARD_OUTPUT_DATA	Data is of type ApexReadCardOutputData .
APEX_DATA_TYPE_ID_CONTROL_OUTPUT_DATA	Data is of type ApexControlOutputData .
APEX_DATA_TYPE_ID_DECODED_TRANSACTION	Data is a decoded transaction (obtained by calling <code>ApexDecodeTransaction</code>).
APEX_DATA_TYPE_ID_LINES_INFO	Data is of type ApexLinesInfo .
APEX_DATA_TYPE_ID_MAX_VALUE	Maximum enum value.

◆ ApexPaperSaleAckMode

enum [ApexPaperSaleAckMode](#)

Mode of operation of the [ApexPaperSaleAck\(\)](#) function.

Enumerator	
APEX_PAPER_SALE_ACK_MODE_TICKET_DATA_READ	The ticket data is read from the printed ticket and used as input.
APEX_PAPER_SALE_ACK_MODE_LAST_SALE	The last sold paper ticket is validated.
APEX_PAPER_SALE_ACK_MODE_MANUAL_INPUT	The ticket serial number is manually typed as input.
APEX_PAPER_SALE_ACK_MODE_MAX_VALUE	Maximum enum value.

◆ ApexPreSelectionMode

enum [ApexPreSelectionMode](#)

Dictates where the pre-selection data is written.

Enumerator

APEX_PRE_SELECTION_MODE_ON_MEMORY	Pre-selection data written on cache memory.
APEX_PRE_SELECTION_MODE_ON_CARD	Pre-selection data written on the card.
APEX_PRE_SELECTION_MODE_MAX_VALUE	Maximum enum value.

◆ ApexTransferMode

enum [ApexTransferMode](#)

Contract transfer mode.

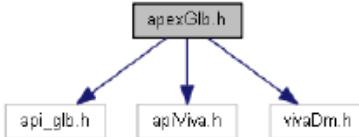
Enumerator

APEX_TRANSFER_MODE_READ	Read a contract from a card to be transferred another. Note After this step the contract has not yet been transferred. This step allows reading the contract to be transferred from the original card. At the end of the transfer operation with APEX_TRANSFER_MODE_LOAD_FROM_CARD must be invoked again for the contract to be written to the destination card.
APEX_TRANSFER_MODE_LOAD_FROM_CARD	Load a contract previously read with APEX_TRANSFER_MODE_READ into the current card.
APEX_TRANSFER_MODE_LOAD_FROM_CATALOG	Load a contract from the catalog to the current card. Note This option is used when the customer provides proof of the loading of a contract into a malfunctioning card.
APEX_TRANSFER_MODE_MAX_VALUE	Maximum enum value.

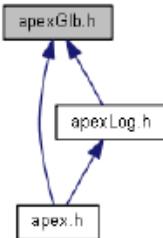
apexGlb.h File Reference

```
#include "api_glb.h" #include "apiViva.h"  
#include "vivaDm.h"
```

Include dependency graph for apexGlb.h:



This graph shows which files directly or indirectly include this file:



[Go to the source code of this file.](#)

Data Structures

struct [ApexFileHeaderInfo](#)

Describes the common data of the configuration files' header. [More...](#)

struct [ApexInfractionAttribute](#)

Infraction attribute. [More...](#)

struct [ApexFineAttribute](#)

Fine attribute. [More...](#)

struct [ApexCardReaderConfig](#)

Data structure containing the required info to initialize a card reader. [More...](#)

struct [ApexSamReaderConfig](#)

Data structure containing the required info to initialize a SAM reader. [More...](#)

struct [ApexProfile](#)

Data structure containing the data that defines a profile. [More...](#)

struct [ApexCardProfile](#)

Data structure containing the data related to a card profile. [More...](#)

struct **ApexEnvironment**
Card environment data structure. [More...](#)

struct **ApexOperator**
Structure that describes an operator. [More...](#)

struct **ApexZone**
Structure that describes a zone. [More...](#)

struct **ApexLine**
Structure that describes a line. [More...](#)

struct **ApexPattern**
Structure that describes a run. [More...](#)

struct **ApexStop**
Structure that describes a stop. [More...](#)

struct **ApexMatrixElement**
Matrix selection element. [More...](#)

struct **ApexSpatialValidity**
Spatial validity data. [More...](#)

struct **ApexContractTemporalValidity**
Structure that contains the data related to a contract's temporal validity. [More...](#)

struct **ApexContractCharacteristics**
Structure that describes a contract's characteristics. [More...](#)

struct **ApexContractRestrictions**
Structure that describes a contract's restrictions. [More...](#)

struct **ApexContract**
Apex contract data structure based on Viva v2 data model structure. [More...](#)

struct **ApexEventContractUsage**
Structure containing the information on the usage of a contract. [More...](#)

struct **ApexEvent**
Apex event data structure. [More...](#)

struct **ApexHolderId**
Apex holder identification data structure. [More...](#)

struct **ApexLoyaltyOperatorRecord**
Loyalty data record structure. [More...](#)

struct **ApexLoyaltyOperatorData**
Operator specific loyalty data structure. [More...](#)

struct **ApexLoyaltyData**

Loyalty data structure. [More...](#)

struct **ApexParkData**

Apex Parking Data structure based on Viva v2 data model structure. [More...](#)

struct **ApexCardData**

Structure containing the card data. [More...](#)

struct **ApexCardDataExtra**

Structure containing the loyalty records and park data read from a card. [More...](#)

struct **ApexIssueData**

Structure containing the required data for a card issuing. [More...](#)

struct **ApexCardInfo**

Card information. [More...](#)

struct **ApexLowLevelError**

Details information on errors occurring on a lower level than the API-APEX. [More...](#)

struct **ApexLastError**

Contains all available information on the last error status. [More...](#)

struct **ApexOperatorConfig**

Apex operator configuration parameters. [More...](#)

struct **ApexInitParameters**

Apex initialization parameters. [More...](#)

struct **ApexCheckConfigFilesInputParameters**

ApexCheckConfigFiles() input parameters. [More...](#)

struct **ApexCardDetectedInfo**

Structure containing all data related to the detected card. [More...](#)

struct **ApexBinary**

Generic structure to hold binary data. [More...](#)

struct **ApexCardBinaries**

Structure containing all binary data read from a card. [More...](#)

struct **ApexProductCategory**

Product Category. [More...](#)

struct **ApexCardTypeId**

Data structure containing a card type identifier. [More...](#)

struct **ApexProfileCombination**

Represents a profile combination. [More...](#)

struct **ApexProductSalesPackage**

Sales package of a product. [More...](#)

struct	ApexCatalogProduct Contains the sale details of a product. More...
struct	ApexProductZoneChoice Represents a choice available for a zone selection. More...
struct	ApexProductSpatialValidityChoice Represents a choice available for a spatial validity selection. More...
struct	ApexProductSalesPackageChoice Represents a choice available for a sales package selection. More...
struct	ApexProductParameter Product parameter to be configured. More...
struct	ApexPhysicalSupport Details of the physical card required to complete the transport product sale. More...
struct	ApexProductConfiguration Represents a product configuration. More...
struct	ApexControlOutputData Structure containing all data data related to the control operation and its result. More...
struct	ApexInfraction Infraction. More...
struct	ApexFine Fine. More...
struct	ApexStopInfo Information of a stop. More...
struct	ApexPatternInfo Information of a pattern. More...
struct	ApexLineInfo Information of a line. More...
struct	ApexLinesInfo Lines Info array. More...
struct	ApexGetInfractionsInputParameters ApexGetInfractions() input parameters. More...
struct	ApexControlFine Control Fine. More...
struct	ApexDamagedCardInfo Damaged card information. More...

- struct **ApexGetFinesInputParameters**
[ApexGetFines\(\)](#) input parameters. [More...](#)
- struct **ApexGetLinesInputParameters**
[ApexGetLines\(\)](#) input parameters. [More...](#)
- struct **ApexConfigurePreSelectionParameters**
Pre-selection configuration parameters. [More...](#)
- struct **ApexPreSelectionConfiguration**
Pre-selection configuration data. [More...](#)
- struct **ApexGetCatalogParameters**
[ApexGetCatalog\(\)](#) input parameters. [More...](#)
- struct **ApexConfigureProductParameters**
Data structure containing all the input data required by the function [ApexConfigureProduct\(\)](#).
[More...](#)
- struct **ApexPaymentInfo**
Payment information. [More...](#)
- struct **ApexConfirmValidationInfo**
Structure containing information about the validation operation in progress. [More...](#)
- struct **ApexTripDuration**
Structure that indicates the trip duration. [More...](#)
- struct **ApexValidationInfo**
Structure that indicates the remaining and decremented units of the card and the name of the contract(s) validated. [More...](#)
- struct **ApexConfirmTransferInfo**
Structure containing information about the transferral operation in progress. [More...](#)
- struct **ApexConfirmCancelInfo**
Structure containing information about the cancellation operation in progress. [More...](#)
- struct **ApexPaperTicketData**
Data to be printed on the onboard ticket. [More...](#)
- struct **ApexBlacklistCardElement**
Information of the Card Blacklist element. [More...](#)
- struct **ApexBlacklistSamElement**
Information of the SAM Blacklist element. [More...](#)
- struct **ApexGreylistElement**
Information of the Greylist element. [More...](#)
- struct **ApexSpatialValidityData**
Spatial validity data. [More...](#)

struct **ApexWhitelistProfileElement**
Information of the Whitelist (Profile) element. [More...](#)

struct **ApexWhitelistCardElement**
Information of the Whitelist (card) element. [More...](#)

struct **ApexGreenlistElement**
Information of the Greenlist element. [More...](#)

Macros

#define **K_APEX_FILE_PATH_MAX_LENGTH** K_OS_FILE_PATH_MAX_SIZE - 1
Maximum length of a file path. [More...](#)

#define **K_APEX_FILE_PATH_MAX_SIZE** K_OS_FILE_PATH_MAX_SIZE
Maximum size of a file path length (NULL terminator included). [More...](#)

#define **K_APEX_LIBRARY_VERSION_MAX_LENGTH** 11

#define **K_APEX_LIBRARY_VERSION_MAX_SIZE** K_APEX_LIBRARY_VERSION_MAX_LENGTH
Maximum size for the library version string buffer (NULL terminator included). [More...](#)

#define **K_APEX_FILE_VERSION_MAX_LENGTH** 7
Maximum length of the file version string. [More...](#)

#define **K_APEX_FILE_VERSION_MAX_SIZE** K_APEX_FILE_VERSION_MAX_LENGTH + 1
Maximum size for the file version string buffer (NULL terminator included). [More...](#)

#define **K_APEX_CARD_PIN_CODE_MAX_SIZE** 4
Maximum size for the card PIN code. [More...](#)

#define **K_APEX_PROFILES_MAX_SIZE** K_VIVA HOLDER PROFILE ENTRY MAX LENGTH
Maximum number of profiles. [More...](#)

#define **K_APEX_ISSUER_DATA_MAX_SIZE** K_VIVA_ISSUER_DATA_MAX_LENGTH
Maximum size for the issuer data. [More...](#)

#define **K_APEX_SPATIAL_VALIDITY_MAX_SIZE** K_VIVA_SPATIAL_VALIDITY_MAX_RECORDS
Maximum number of spatial validity records. [More...](#)

#define **K_APEX_MAX_AVAILABLE_ZONES_COUNT** 135
Maximum number of available zones. [More...](#)

#define **K_APEX_LOYALTY_RECORDS_MAX_SIZE** 8
Maximum number of loyalty data records. [More...](#)

#define **K_APEX HOLDER NAME MAX LENGTH** K_VIVA HOLDER ID NAME MAX LENGTH -
Maximum size for the holder name string. [More...](#)

#define **K_APEX HOLDER NAME MAX SIZE** K_VIVA HOLDER ID NAME MAX LENGTH
Maximum size for the holder name string (NULL terminator included). [More...](#)

```
#define K_APEX_CONTRACTS_MAX_SIZE K_MAX_CONTRACT_GEN2
Maximum number of contracts for Apex data structures. More...
```

```
#define K_APEX_CARD_TYPE_ID_MAX_LENGTH 36
Maximum length of the card type ID string. More...
```

```
#define K_APEX_CARD_TYPE_ID_MAX_SIZE K_APEX_CARD_TYPE_ID_MAX_LENGTH + 1
Maximum size for the card type ID string buffer (NULL terminator included). More...
```

```
#define K_APEX_SAM_TYPE_ID_MAX_LENGTH 36
Maximum length of the sam type ID string. More...
```

```
#define K_APEX_SAM_TYPE_ID_MAX_SIZE K_APEX_SAM_TYPE_ID_MAX_LENGTH + 1
Maximum size for the sam type ID string buffer (NULL terminator included). More...
```

```
#define K_APEX_OPERATOR_ID_MAX_LENGTH 36
Maximum length of the operator ID string. More...
```

```
#define K_APEX_OPERATOR_ID_MAX_SIZE K_APEX_OPERATOR_ID_MAX_LENGTH + 1
Maximum size for the operator ID string buffer (NULL terminator included). More...
```

```
#define K_APEX_NETWORK_ID_MAX_LENGTH 36
Maximum length of the network ID string. More...
```

```
#define K_APEX_NETWORK_ID_MAX_SIZE K_APEX_NETWORK_ID_MAX_LENGTH + 1
Maximum size for the network ID string buffer (NULL terminator included). More...
```

```
#define K_APEX_DEVICE_ID_MAX_LENGTH 40
Maximum length of the device (POS) ID string. More...
```

```
#define K_APEX_DEVICE_ID_MAX_SIZE K_APEX_DEVICE_ID_MAX_LENGTH + 1
Maximum size for the device (POS) ID string buffer (NULL terminator included). More...
```

```
#define K_APEX_CHANNEL_ID_MAX_LENGTH 36
Maximum length of the channel ID string. More...
```

```
#define K_APEX_CHANNEL_ID_MAX_SIZE K_APEX_CHANNEL_ID_MAX_LENGTH + 1
Maximum size for the channel ID string buffer (NULL terminator included). More...
```

```
#define K_APEX_PROFILE_ID_MAX_LENGTH 36
Maximum length of the profile ID string. More...
```

```
#define K_APEX_PROFILE_ID_MAX_SIZE K_APEX_PROFILE_ID_MAX_LENGTH + 1
Maximum size for the profile ID string buffer (NULL terminator included). More...
```

```
#define K_APEX_PRODUCT_ID_MAX_LENGTH 36
Maximum length of the product ID string. More...
```

```
#define K_APEX_PRODUCT_ID_MAX_SIZE K_APEX_PRODUCT_ID_MAX_LENGTH + 1
Maximum size for the product ID string buffer (NULL terminator included). More...
```

```
#define K_APEX_GENERIC_ID_MAX_LENGTH 36
Maximum length of the generic ID string. More...

#define K_APEX_GENERIC_ID_MAX_SIZE K_APEX_GENERIC_ID_MAX_LENGTH + 1
Maximum size for the generic ID string buffer (NULL terminator included). More...

#define K_APEX_SALES_PACKAGE_ID_MAX_LENGTH 36
Maximum length of the sales package ID string. More...

#define K_APEX_SALES_PACKAGE_ID_MAX_SIZE K_APEX_SALES_PACKAGE_ID_MAX_LENGTH + 1
Maximum size for the sales package ID string buffer (NULL terminator included). More...

#define K_APEX_TAX_ID_MAX_LENGTH 36
Maximum length of the sales package ID string. More...

#define K_APEX_TAX_ID_MAX_SIZE K_APEX_TAX_ID_MAX_LENGTH + 1
Maximum size for the sales package ID string buffer (NULL terminator included). More...

#define K_APEX_READER_ADDRESS_MAX_LENGTH K_COMM_DEV_NAME_MAX_LENGTH - 1
Maximum length of a reader address. More...

#define K_APEX_READER_ADDRESS_MAX_SIZE K_APEX_READER_ADDRESS_MAX_LENGTH + 1
Maximum size of a reader address (NULL terminator included). More...

#define K_APEX_OPERATION_PLAN_ID_MAX_LENGTH 36
Maximum length of the operation plan ID string. More...

#define K_APEX_OPERATION_PLAN_ID_MAX_SIZE K_APEX_OPERATION_PLAN_ID_MAX_LENGTH + 1
Maximum size for the operation plan ID string buffer (NULL terminator included). More...

#define K_APEX_BLOCK_ID_MAX_LENGTH 36
Maximum length of the vehicle block ID string. More...

#define K_APEX_BLOCK_ID_MAX_SIZE K_APEX_BLOCK_ID_MAX_LENGTH + 1
Maximum size for the vehicle block ID string buffer (NULL terminator included). More...

#define K_APEX_DUTY_ID_MAX_LENGTH 36
Maximum length of the driver duty ID string. More...

#define K_APEX_DUTY_ID_MAX_SIZE K_APEX_DUTY_ID_MAX_LENGTH + 1
Maximum size for the driver duty ID string buffer (NULL terminator included). More...

#define K_APEX_JOURNEY_ID_MAX_LENGTH 36
Maximum length of the journey ID string. More...

#define K_APEX_JOURNEY_ID_MAX_SIZE K_APEX_JOURNEY_ID_MAX_LENGTH + 1
Maximum size for the journey ID string buffer (NULL terminator included). More...

#define K_APEX_EXTRA_JOURNEY_ID_MAX_LENGTH 36
Maximum length of the extra journey ID string. More...

#define K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE K_APEX_EXTRA_JOURNEY_ID_MAX_LENGTH + 1
Maximum size for the extra journey ID string buffer (NULL terminator included). More...
```

Maximum size for the extra journey ID string buffer (NULL terminator included). [More...](#)

#define **K_APEX_ZONE_ID_MAX_LENGTH** 36

Maximum length of the zone ID string. [More...](#)

#define **K_APEX_ZONE_ID_MAX_SIZE** **K_APEX_ZONE_ID_MAX_LENGTH** + 1

Maximum size for the zone ID string buffer (NULL terminator included). [More...](#)

#define **K_APEX_ZONE_NAME_MAX_LENGTH** 50

Maximum length for zone names. [More...](#)

#define **K_APEX_ZONE_NAME_MAX_SIZE** **K_APEX_ZONE_NAME_MAX_LENGTH** + 1

Maximum size for zone name buffers (NULL terminator included). [More...](#)

#define **K_APEX_LINE_ID_MAX_LENGTH** 36

Maximum length of the line ID string. [More...](#)

#define **K_APEX_LINE_ID_MAX_SIZE** **K_APEX_LINE_ID_MAX_LENGTH** + 1

Maximum size for the line ID string buffer (NULL terminator included). [More...](#)

#define **K_APEX_LINE_NAME_MAX_LENGTH** 50

#define **K_APEX_LINE_NAME_MAX_SIZE** **K_APEX_LINE_NAME_MAX_LENGTH** + 1

#define **K_APEX_PATTERN_ID_MAX_LENGTH** 36

Maximum length of the pattern ID string. [More...](#)

#define **K_APEX_PATTERN_ID_MAX_SIZE** **K_APEX_PATTERN_ID_MAX_LENGTH** + 1

Maximum size for the pattern ID string buffer (NULL terminator included). [More...](#)

#define **K_APEX_PATTERN_NAME_MAX_LENGTH** 50

#define **K_APEX_PATTERN_NAME_MAX_SIZE** **K_APEX_PATTERN_NAME_MAX_LENGTH** + 1

#define **K_APEX_STOP_ID_MAX_LENGTH** 36

Maximum length of the stop ID string. [More...](#)

#define **K_APEX_STOP_ID_MAX_SIZE** **K_APEX_STOP_ID_MAX_LENGTH** + 1

Maximum size for the stop ID string buffer (NULL terminator included). [More...](#)

#define **K_APEX_STOP_NAME_MAX_LENGTH** 50

Maximum length for stop names. [More...](#)

#define **K_APEX_STOP_NAME_MAX_SIZE** **K_APEX_STOP_NAME_MAX_LENGTH** + 1

Maximum size for stop name buffers (NULL terminator included). [More...](#)

#define **K_APEX_CSV_MAX_LENGTH** 2048

Size of a csv data. [More...](#)

#define **K_APEX_CSV_MAX_SIZE** **K_APEX_CSV_MAX_LENGTH** + 1

Size of a csv string buffer. [More...](#)

```
#define K_APEX_PRODUCT_NAME_MAX_LENGTH 50
Maximum length of the product / contract name string. More...

#define K_APEX_PRODUCT_NAME_MAX_SIZE K_APEX_PRODUCT_NAME_MAX_LENGTH + 1
Maximum size for the product / contract name string buffer(NULL terminator included). More...

#define K_APEX_TRANSACTION_ID_MAX_LENGTH 36
Maximum length of the transaction id string. More...

#define K_APEX_TRANSACTION_ID_MAX_SIZE K_APEX_TRANSACTION_ID_MAX_LENGTH + 1
Maximum size for the transaction id string buffer (NULL terminator included). More...

#define K_APEX_OPERATOR_SHORT_NAME_MAX_LENGTH 10
Maximum length of the operator short name string. More...

#define K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE K_APEX_OPERATOR_SHORT_NAME_
Maximum size for the operator short name string buffer (NULL terminator included). More...

#define K_APEX_OPERATOR_NAME_MAX_LENGTH 50
Maximum length of the operator name string. More...

#define K_APEX_OPERATOR_NAME_MAX_SIZE K_APEX_OPERATOR_NAME_MAX_LENGTH +
Maximum size for the operator name string buffer (NULL terminator included). More...

#define K_APEX_PROFILE_NAME_MAX_LENGTH 50
Maximum length of the operator name string. More...

#define K_APEX_PROFILE_NAME_MAX_SIZE K_APEX_PROFILE_NAME_MAX_LENGTH + 1
Maximum size for the operator name string buffer (NULL terminator included). More...

#define K_APEX_SELECT_APP_INFO_MAX_SIZE K_INFO_MAX_LENGTH
Maximum size of the detected card info byte array. More...

#define K_APEX_INFRACTION_ID_MAX_LENGTH 36
Maximum length of the infraction id string. More...

#define K_APEX_INFRACTION_ID_MAX_SIZE K_APEX_INFRACTION_ID_MAX_LENGTH + 1
Maximum size for the infraction id string buffer (NULL terminator included). More...

#define K_APEX_INFRACTION_DESCRIPTION_MAX_LENGTH 255
Maximum length of the infraction description string. More...

#define K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE K_APEX_INFRACTION_DESCRIPTION_
Maximum size for the infraction description string buffer (NULL terminator included). More...

#define K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_LENGTH 36
Maximum length of the infraction attribute id string. More...

#define K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE K_APEX_INFRACTION_ATTRIBUTE_
Maximum size for the infraction attribute id string buffer (NULL terminator included). More...

#define K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_LENGTH 255
```

Maximum length of the infraction description string. [More...](#)

```
#define K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_SIZE K_APEX_INFRACTION_+ 1
```

Maximum size for the infraction description string buffer (NULL terminator included). [More...](#)

```
#define K_APEX_INFRACTION_PROCEDURE_MAX_LENGTH 255
```

Maximum length of the infraction procedure string. [More...](#)

```
#define K_APEX_INFRACTION_PROCEDURE_MAX_SIZE K_APEX_INFRACTION_PROCEDURE_
```

Maximum size for the infraction procedure string buffer (NULL terminator included). [More...](#)

```
#define K_APEX_FINE_ID_MAX_LENGTH 36
```

Maximum length of the fine id string. [More...](#)

```
#define K_APEX_FINE_ID_MAX_SIZE K_APEX_FINE_ID_MAX_LENGTH + 1
```

Maximum size for the fine id string buffer (NULL terminator included). [More...](#)

```
#define K_APEX_FINE_DESCRIPTION_MAX_LENGTH 255
```

Maximum length of the fine description string. [More...](#)

```
#define K_APEX_FINE_DESCRIPTION_MAX_SIZE K_APEX_FINE_DESCRIPTION_MAX_LENGTH
```

Maximum size for the fine description string buffer (NULL terminator included). [More...](#)

```
#define K_APEX_FINE_ATTRIBUTE_ID_MAX_LENGTH 36
```

Maximum length of the fine attribute id string. [More...](#)

```
#define K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE K_APEX_FINE_ATTRIBUTE_ID_MAX_LENGTH
```

Maximum size for the fine attribute id string buffer (NULL terminator included). [More...](#)

```
#define K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_LENGTH 255
```

Maximum length of the fine attribute description string. [More...](#)

```
#define K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_SIZE K_APEX_FINE_ATTRIBUTE_DES
```

Maximum size for the fine attribute description string buffer (NULL terminator included). [More...](#)

```
#define K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_LENGTH 50
```

```
#define K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE K_APEX_PRODUCT_CATE
```

```
#define K_APEX_CONFIGURATION_ID_MAX_LENGTH 36
```

Maximum length of the product configuration id string. [More...](#)

```
#define K_APEX_CONFIGURATION_ID_MAX_SIZE K_APEX_CONFIGURATION_ID_MAX_LENGTH
```

Maximum size for the product configuration id string buffer (NULL terminator included). [More...](#)

```
#define K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_LENGTH 36
```

Maximum length of the parameter text value string. [More...](#)

```
#define K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_SIZE K_APEX_PRODUCT_PARAM_TI
```

Maximum size for the parameter text value buffer (NULL terminator included). [More...](#)

```
#define K_APEX_PAPER_TICKET_NUMBER_MAX_LENGTH 20
Maximum length of the ticket number text string. More...

#define K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE K_APEX_PAPER_TICKET_NUMBER_M/
Maximum size for the ticket number text buffer (NULL terminator included). More...

#define K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_LENGTH 136
Maximum length of the paper ticket security data text string. More...

#define K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE K_APEX_PAPER_TICKET_SEC/
Maximum size for the paper ticket security data text buffer (NULL terminator included). More...

#define K_APEX_BINARY_MAX_SIZE K_VIVA_CONTRACT_AUX_COUNTER_BINARY_MAX_SIZE
Maximum size of a binary byte array. More...

#define K_APEX_ACTION_LISTS_ITEM_ID_MAX_LENGTH 36

#define K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE K_APEX_ACTION_LISTS_ITEM_ID_MAX_/

#define K_APEX_PERSONALIZATION_ID_MAX_LENGTH 36

#define K_APEX_PERSONALIZATION_ID_MAX_SIZE K_APEX_PERSONALIZATION_ID_MAX_ LE

#define K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_LENGTH 36

#define K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_SIZE K_APEX_ACTION_LISTS_AU

#define K_APEX_SPATIAL_VALIDITY_ID_MAX_LENGTH 36

#define K_APEX_SPATIAL_VALIDITY_ID_MAX_SIZE K_APEX_SPATIAL_VALIDITY_ID_MAXLEN

#define K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_LENGTH 36

#define K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE K_APEX_PRODUCT_MATRIX_E

#define K_APEX_ACCESS_KEY_MAX_LENGTH 256
Maximum length of the access key string. More...

#define K_APEX_ACCESS_KEY_MAX_SIZE K_APEX_ACCESS_KEY_MAX_LENGTH + 1
Maximum size for the access key string buffer (NULL terminator included). More...

#define K_APEX_INFRACTION_NUMBER_MAX_LENGTH 20
Maximum length of the infraction number string. More...

#define K_APEX_INFRACTION_NUMBER_MAX_SIZE K_APEX_INFRACTION_NUMBER_MAX_LE
Maximum size for the infraction number buffer (NULL terminator included). More...

#define K_APEX_TRANSPORT_SERVICE_TYPOLOGY_MAX_LENGTH 5
Maximum length of the transport service typology string. More...

#define K_APEX_TRANSPORT_SERVICE_TYPOLOGY_MAX_SIZE K_APEX_TRANSPORT_SERV
Maximum size for the transport service typology string buffer (NULL terminator included). More.
```

```
#define K_APEX_OFFENDER_NAME_MAX_LENGTH 128
Maximum length of the offender name string. More...
```

```
#define K_APEX_OFFENDER_NAME_MAX_SIZE K_APEX_OFFENDER_NAME_MAX_LENGTH +
Maximum size for the offender name string buffer (NULL terminator included). More...
```

```
#define K_APEX_OFFENDER_ADDRESS_MAX_LENGTH 128
Maximum length of the offender address string. More...
```

```
#define K_APEX_OFFENDER_ADDRESS_MAX_SIZE K_APEX_OFFENDER_ADDRESS_MAX_LENGTH +
Maximum size for the offender address string buffer (NULL terminator included). More...
```

```
#define K_APEX_OFFENDER_POSTAL_CODE_MAX_LENGTH 8
Maximum length of the offender postal code string. More...
```

```
#define K_APEX_OFFENDER_POSTAL_CODE_MAX_SIZE K_APEX_OFFENDER_POSTAL_CODE_MAX_LENGTH +
Maximum size for the offender postal code string buffer (NULL terminator included). More...
```

```
#define K_APEX_IDENTITY_NUMBER_MAX_LENGTH 32
Maximum length of the identity number string. More...
```

```
#define K_APEX_IDENTITY_NUMBER_MAX_SIZE K_APEX_IDENTITY_NUMBER_MAX_LENGTH +
Maximum size for the identity number string buffer (NULL terminator included). More...
```

```
#define K_APEX_VAT_NUMBER_MAX_LENGTH 12
Maximum length of the VAT number string. More...
```

```
#define K_APEX_VAT_NUMBER_MAX_SIZE K_APEX_VAT_NUMBER_MAX_LENGTH + 1
Maximum size for the VAT number string buffer (NULL terminator included). More...
```

```
#define K_APEX_INVOICE_NUMBER_MAX_LENGTH 30
Maximum length of the invoice number string. More...
```

```
#define K_APEX_INVOICE_NUMBER_MAX_SIZE K_APEX_INVOICE_NUMBER_MAX_LENGTH +
Maximum size for the invoice number string buffer (NULL terminator included). More...
```

```
#define K_APEX_DOCUMENT_OBS_MAX_LENGTH 1024
Maximum length of the document observation string. More...
```

```
#define K_APEX_DOCUMENT_OBS_MAX_SIZE K_APEX_DOCUMENT_OBS_MAX_LENGTH + 1
Maximum size for the document observation string buffer (NULL terminator included). More...
```

```
#define K_APEX_INFRACTION_PLACE_MAX_LENGTH 64
Maximum length of the infraction place string. More...
```

```
#define K_APEX_INFRACTION_PLACE_MAX_SIZE K_APEX_INFRACTION_PLACE_MAX_LENGTH +
Maximum size for the infraction place string buffer (NULL terminator included). More...
```

```
#define K_APEX_DOCUMENT_NAME_MAX_LENGTH 64
Maximum length of the document name string. More...
```

```
#define K_APEX_DOCUMENT_NAME_MAX_SIZE K_APEX_DOCUMENT_NAME_MAX_LENGTH +
Maximum size for the document name string buffer (NULL terminator included). More...
```

Maximum size for the document name string buffer (NULL terminator included). [More...](#)

Typedefs

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_TransactionReport**) (void *inCallbackContext, [ApexTransactionType](#) inTransactionType, T_U16 inTransactionId, T_S8 *inTransaction)
Callback to report to the application the transactions performed during the execution of a given operation. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_ConfirmValidation**) (void *inCallbackContext, [ApexCardInfo](#) *inCardInfo, [ApexConfirmValidationInfo](#) *inValidationInfo)
Callback to confirm the validation execution. This callback is invoked before APEX changes any data on the card. This callback is bi-directional gates where it is necessary to confirm that the channel is free. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_PostValidation**) (void *inCallbackContext, [ApexCardInfo](#) *inCardInfo, [ApexValidationInfo](#) *inValidationInfo)
Callback that provides information about the validation macro. This callback is always invoked, except when an internal error occurs during the validation flow. In other words, when [ApexValidate\(\)](#) is called, this callback will be invoked whether the card was accepted or rejected. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_ConfirmTransfer**) (void *inCallbackContext, [ApexCardInfo](#) *inCardInfo, [ApexConfirmTransferInfo](#) *inTransferInfo)
Callback to confirm the contract transfer execution. This callback is invoked before APEX changes any data on the card. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_ConfirmCancel**) (void *inCallbackContext, [ApexCardInfo](#) *inCardInfo, [ApexConfirmCancelInfo](#) *inCancelInfo)
Callback to confirm the contract cancellation. This callback is invoked before APEX changes any data on the card. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_GetLoadSequenceId**) (void *inCallbackContext, T_U16 inMachineCode, T_CardDataModel inCardDataModel, T_U16 *outNumDaily)
Callback to get the current daily number of operations for a machine. This value is written on the card. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_WebService**) (void *inCallbackContext, const T_S8 *inHttpHeaders, const T_S8 *inBodyContent, T_U16 *inOutResponseLength, T_S8 *outResponse, T_U16 *outHttpCode)
Callback to get online access. This callback is used to do a check on greenlist load operations. [More...](#)

typedef [ApexCallbackStatus](#)(CALLBACK * **F_CB_CheckBlacklistCard**) (void *inCallbackContext, T_S8 inCardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE], T_S8 *inCardSerialNumber, T_U8 *outElementExists, [ApexBlacklistCardElement](#) *outBlacklistCardElement)
Callback to check the card blacklist in an environment out-of-box configuration files. [More...](#)

typedef ApexCallbackStatus (CALLBACK * F_CB_CheckBlacklistSam) (void *inCallbackContext, T_L *inSamSerialNumber, T_U8 *outElementExists, ApexBlacklistSamElement *outBlacklistSamElement) Callback to check the SAM blacklist in an environment outside APEX's configuration files. More...
typedef ApexCallbackStatus (CALLBACK * F_CB_CheckGreylist) (void *inCallbackContext, T_S8 inCardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE], T_ *inCardSerialNumber, T_S8 inProductLongId[K_APEX_PRODUCT_ID_MAX_SIZE], T_ inMachineCode, T_UtilDate *inLoadDate, T_U32 inLoadSequenceNumber, T_U8 *outElementExists, ApexGreylistElement *outGreylistElement) Callback to check the greylist in an environment outside APEX's configuration files. More...
typedef ApexCallbackStatus (CALLBACK * F_CB_CheckWhitelistProfile) (void *inCallbackContext, T inLastWhitelistItemID[K_APEX_ACTION_LISTS_ITEM_ID] T_U16 inProfileIdsCount, T_S8 inProfileIdsArray[K_APEX_PROFILES_MAX_SIZE] [K_APEX_PROFILE_ID_MAX_SIZE], T_UtilDateTime *inTransactionDateTime, T_S8 inOperatorLongId[K_APEX_OPERATOR_ID_MAX_SIZE], *outElementExists, T_U8 *outHasNext, ApexWhitelistPro *outWhitelistProfileElement) Callback to check the whitelist for profile combinations in an environment outside APEX's configuration files. More...
typedef ApexCallbackStatus (CALLBACK * F_CB_CheckWhitelistCard) (void *inCallbackContext, T_S inLastWhitelistItemID[K_APEX_ACTION_LISTS_ITEM_ID] T_S8 inCardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE] *inCardSerialNumber, T_UtilDateTime *inTransactionDate *outElementExists, T_U8 *outHasNext, ApexWhitelistCard *outWhitelistCardElement) Callback to check the whitelist for a card in an environment outside APEX's configuration files. More...
typedef ApexCallbackStatus (CALLBACK * F_CB_CheckGreenlist) (void *inCallbackContext, T_S8 inLastGreenlistItemID[K_APEX_ACTION_LISTS_ITEM_ID] T_S8 inCardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE] *inCardSerialNumber, T_UtilDateTime *inTransactionDate *outElementExists, T_U8 *outHasNext, ApexGreenlistEle *outGreenlistElement) Callback to check the greenlist in an environment outside APEX's configuration files. More...

Enumerations

enum ApexOutOfBoundsType { APEX_OUT_OF_BOUNDS_TYPE_WITHIN_BOUNDS = 0x00, APEX_OUT_OF_BOUNDS_TYPE_GPS_FAILURE = 0x01, APEX_OUT_OF_BOUNDS_TYPE_UNKNOWN_STOP = 0x02, APEX_OUT_OF_BOUNDS_TYPE_STOPPED = 0x03, APEX_OUT_OF_BOUNDS_TYPE_MAX_VALUE = 0x04 }
Identifies the activation type of out of bounds validation. More...

```
enum ApexSessionType {
    APEX_SESSION_TYPE_NONE = 0x00, APEX_SESSION_TYPE_VALIDATION = 0x01,
    APEX_SESSION_TYPE_LOAD = 0x02, APEX_SESSION_TYPE_PERSONALIZATION = 0x03,
    APEX_SESSION_TYPE_MAX_VALUE = 0x04
}
```

Identifies the type of session. More...

```
enum ApexTransactionType {
    APEX_TRANSACTION_TYPE_UNKNOWN = 0x00, APEX_TRANSACTION_TYPE_SALE = 0x01,
    APEX_TRANSACTION_TYPE_LOAD = 0x02, APEX_TRANSACTION_TYPE_SALE_LOAD = 0x03,
    APEX_TRANSACTION_TYPE_ANNUAL_SALE = 0x04, APEX_TRANSACTION_TYPE_ANNUAL_LOAD = 0x05,
    APEX_TRANSACTION_TYPE_ANNUAL_SALE_LOAD = 0x06,
    APEX_TRANSACTION_TYPE_TRIP_REFUND = 0x07,
    APEX_TRANSACTION_TYPE_REMOVE_CONTRACT = 0x08, APEX_TRANSACTION_TYPE_TRANSFER = 0x09,
    APEX_TRANSACTION_TYPE_ANNUAL_TRANSFER = 0x0A,
    APEX_TRANSACTION_TYPE_VALIDATION = 0x0B,
    APEX_TRANSACTION_TYPE_PERSONALIZATION = 0x0C,
    APEX_TRANSACTION_TYPE_INVALIDATION = 0x0D, APEX_TRANSACTION_TYPE_REHABILITATION = 0x0E,
    APEX_TRANSACTION_TYPE_CONTROL = 0x0F,
    APEX_TRANSACTION_TYPE_CONTROL_DECISION = 0x10,
    APEX_TRANSACTION_TYPE_PRESELECTION = 0x11,
    APEX_TRANSACTION_TYPE_GREENLIST_ERROR = 0x12, APEX_TRANSACTION_TYPE_GREYLIST_ERROR = 0x13,
    APEX_TRANSACTION_TYPE_MAX_VALUE = 0x14
}
```

Identifies the type of the transaction. More...

```
enum ApexControlEnvironmentStatus {
    APEX_CONTROL_ENVIRONMENT_STATUS_UNKNOWN = 0x00,
    APEX_CONTROL_ENVIRONMENT_STATUS_VALID = 0x01,
    APEX_CONTROL_ENVIRONMENT_STATUS_CARD_EXPIRED = 0x02,
    APEX_CONTROL_ENVIRONMENT_STATUS_CARD_INVALIDATED = 0x03,
    APEX_CONTROL_ENVIRONMENT_STATUS_CARD_CLEAN = 0x04,
    APEX_CONTROL_ENVIRONMENT_STATUS_CARD_IN_BLACKLIST = 0x05,
    APEX_CONTROL_ENVIRONMENT_STATUS_SAM_IN_BLACKLIST = 0x06,
    APEX_CONTROL_ENVIRONMENT_STATUS_MAX_VALUE = 0x07
}
```

Control environment status. More...

```
enum ApexControlContractStatus {
    APEX_CONTROL_CONTRACT_STATUS_UNKNOWN = 0x00,
    APEX_CONTROL_CONTRACT_STATUS_VALID = 0x01,
    APEX_CONTROL_CONTRACT_STATUS_INVALID_TEMPORAL_VALIDITY = 0x02,
    APEX_CONTROL_CONTRACT_STATUS_INVALID_SPATIAL_VALIDITY = 0x03,
    APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_SPATIAL_VALIDITY = 0x04,
    APEX_CONTROL_CONTRACT_STATUS_INVALID_IN_OPERATOR = 0x05,
    APEX_CONTROL_CONTRACT_STATUS_INVALID_UTILIZATION = 0x06,
    APEX_CONTROL_CONTRACT_STATUS_INVALID_VALIDITY_PERIODS = 0x07,
    APEX_CONTROL_CONTRACT_STATUS_VALID_BUT_NOT_VALIDATED = 0x08,
    APEX_CONTROL_CONTRACT_STATUS_VALID_BUT_NOT_VALIDATEDQUIRES_DEBIT = 0x09,
    APEX_CONTROL_CONTRACT_STATUS_VALID_BUT_NOT_VALIDATED_NOT_ENOUGH_UNITS = 0x0A,
    APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED = 0x0B,
    APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED_REQUIREMENTS = 0x0C,
    APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED_NOT_ENOUGH_UNITS = 0x0D, APEX_CONTROL_CONTRACT_STATUS_IN_GREYLIST = 0x0E,
```

```
APEX_CONTROL_CONTRACT_STATUS_IN_SAM_BLACKLIST = 0x0F,  
APEX_CONTROL_CONTRACT_STATUS_REQUIRED_PROFILE_MISSING = 0x10,  
APEX_CONTROL_CONTRACT_STATUS_FORBIDDEN_PROFILE = 0x11,  
APEX_CONTROL_CONTRACT_STATUS_INVALID_CARD_UNITS = 0x12,  
APEX_CONTROL_CONTRACT_STATUS_INVALID_VALID_DAYS = 0x13,  
APEX_CONTROL_CONTRACT_STATUS_INVALID_MUNICIPALITY_CODE = 0x14,  
APEX_CONTROL_CONTRACT_STATUS_MAX_VALUE = 0x15  
}
```

Control contract status. More...

```
enum ApexValidationStatus {  
    APEX_VALIDATION_STATUS_CONTRACT_VALID = 0x00,  
    APEX_VALIDATION_STATUS_ANTIPASSBACK = 0x01,  
    APEX_VALIDATION_STATUS_CARD_IN_BLACKLIST = 0x02,  
    APEX_VALIDATION_STATUS_SAM_IN_BLACKLIST = 0x03,  
    APEX_VALIDATION_STATUS_CARD_IN_WHITELIST = 0x04,  
    APEX_VALIDATION_STATUS_PROFILE_IN_WHITELIST = 0x05,  
    APEX_VALIDATION_STATUS_INTERCHANGE = 0x06, APEX_VALIDATION_STATUS_INTER  
0x07,  
    APEX_VALIDATION_STATUS_NO_VALID_CONTRACT = 0x08,  
    APEX_VALIDATION_STATUS_CARD_IS_INVALIDATED = 0x09,  
    APEX_VALIDATION_STATUS_EVENT_IS_FULL = 0x0A,  
    APEX_VALIDATION_STATUS_NOT_ENOUGH_UNITS = 0x0B,  
    APEX_VALIDATION_STATUS_CONTRACT_EXPIRED = 0x0C,  
    APEX_VALIDATION_STATUS_MAX_VALUE = 0x0D  
}
```

Validation detail code. This code indicates the specific validation operation being made within the configured validation type. More...

```
enum ApexCallbackStatus { APEX_CALLBACK_STATUS_OK = 0x00, APEX_CALLBACK_STATUS  
0x01, APEX_CALLBACK_STATUS_ERROR = 0x02, APEX_CALLBACK_STATUS_MAX_VAL  
Callback status codes returned by the API-APEX callback functions. More...
```

```
enum ApexConfigureProductMode {  
    APEX_CONFIGURE_PRODUCT_MODE_SALE = 0x00, APEX_CONFIGURE_PRODUCT_MODE  
0x01, APEX_CONFIGURE_PRODUCT_MODE_SALE_LOAD = 0x02,  
    APEX_CONFIGURE_PRODUCT_MODE_TRANSFER_CATALOG = 0x03,  
    APEX_CONFIGURE_PRODUCT_MODE_TRANSFER_BINARY = 0x04,  
    APEX_CONFIGURE_PRODUCT_MODE_MAX_VALUE = 0x05  
}
```

Operation mode of the ApexConfigureProduct function. More...

```
enum ApexConfigureProductStatus {  
    APEX_CONFIGURE_PRODUCT_STATUS_VALID = 0x00,  
    APEX_CONFIGURE_PRODUCT_STATUS_INVALID_SALES_PACKAGE_SELECTION = 0x01  
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_PRODUCT_QUANTITY = 0x02,  
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_START_DATE = 0x03,  
    APEX_CONFIGURE_PRODUCT_STATUS_INVALID_ZONE_SELECTION = 0x04,  
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_SPATIAL_VALIDITY_SELECTION = 0x05  
APEX_CONFIGURE_PRODUCT_STATUS_CONTRACT_VALIDITY_EXCEEDS_CARD_VALID  
APEX_CONFIGURE_PRODUCT_STATUS_CONFIGURED_PRODUCT_ALREADY_EXISTS =  
    APEX_CONFIGURE_PRODUCT_STATUS_CONFIGURED_PRODUCT_DOES_NOT_EXIST =  
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_VOUCHER = 0x09,  
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_CARD_SERIAL_NUMBER = 0x0A,  
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_CARD_TYPE_ID = 0x0B,  
    APEX_CONFIGURE_PRODUCT_STATUS_RELOAD_NOT_YET_AVAILABLE = 0x0C,  
APEX_CONFIGURE_PRODUCT_STATUS_REQUIRED_PRODUCT_NOT_VALID_TEMPORAL
```

```
APEX_CONFIGURE_PRODUCT_STATUS_UNMET_PROFILE_CONDITIONS = 0x0E,  
APEX_CONFIGURE_PRODUCT_STATUS_MAX_VALUE = 0x0F  
}
```

Status of the ApexConfigureProduct function. [More...](#)

enum **ApexProductParamType** {
 APEX_PRODUCT_PARAM_TYPE_SALES_PACKAGE = 0x00,
 APEX_PRODUCT_PARAM_TYPE_PRODUCT_QUANTITY = 0x01,
 APEX_PRODUCT_PARAM_TYPE_START_DATE = 0x02, **APEX_PRODUCT_PARAM_TYPE_SPATIAL_VALIDITY** = 0x04,
 APEX_PRODUCT_PARAM_TYPE_VOUCHER = 0x05,
 APEX_PRODUCT_PARAM_TYPE_CARD_SERIAL_NUMBER = 0x06,
 APEX_PRODUCT_PARAM_TYPE_CARD_TYPE_ID = 0x07,
 APEX_PRODUCT_PARAM_TYPE_MAX_VALUE = 0x08
}
Qualifies the product parameter. [More...](#)

enum **ApexDocumentType** {
 APEX_DOCUMENT_TYPE_UNDEFINED = 0x00, **APEX_DOCUMENT_TYPE_CITIZEN_CARD** = 0x01,
 APEX_DOCUMENT_TYPE_IDENTITY_CARD = 0x02, **APEX_DOCUMENT_TYPE_FINE_NOTE** = 0x03,
 APEX_DOCUMENT_TYPE_OTHER = 0x04, **APEX_DOCUMENT_TYPE_MAX_VALUE** = 0x05
}
Document type. [More...](#)

enum **ApexPaymentMethod** {
 APEX_PAYMENT_METHOD_UNDEFINED = 0x00, **APEX_PAYMENT_METHOD_MULTIPLE** = 0x01, **APEX_PAYMENT_METHOD_CASH** = 0x02, **APEX_PAYMENT_METHOD_CREDIT_CARD** = 0x03, **APEX_PAYMENT_METHOD_ACCOUNT_DEBIT** = 0x04, **APEX_PAYMENT_METHOD_PMB** = 0x05, **APEX_PAYMENT_METHOD_MB** = 0x06, **APEX_PAYMENT_METHOD_VOUCHER** = 0x07,
 APEX_PAYMENT_METHOD_MAX_VALUE = 0x08
}
Payment method. [More...](#)

enum **ApexPreSelectionType** { **APEX_PRESELECTION_TYPE_OPTIONAL** = 0x00,
APEX_PRESELECTION_TYPE_REQUIRED = 0x01, **APEX_PRESELECTION_TYPE_NOT_ALLOWED** = 0x02, **APEX_PRESELECTION_TYPE_MAX_VALUE** = 0x03 }
Contract pre-selection type of a product. [More...](#)

enum **ApexPreSelectionODType** { **APEX_PRESELECTION_OD_TYPE_NOT_ALLOWED** = 0x00,
APEX_PRESELECTION_OD_TYPE_REQUIRED = 0x01, **APEX_PRESELECTION_OD_TYPE_OPTIONAL** = 0x02, **APEX_PRESELECTION_OD_TYPE_MAX_VALUE** = 0x03 }
Origin-Destination pre-selection type of a product. [More...](#)

enum **ApexAntipassbackMode** { **APEX_ANTIPASSBACK_NORMAL** = 0, **APEX_ANTIPASSBACK_STRICT** = 1, **APEX_ANTIPASSBACK_MAX_VALUE** = 2 }
Behavior to apply during anti-passback checks. [More...](#)

enum **ApexCountersTransactionContext** {
 APEX_COUNTERS_TRANSACTION_CONTEXT_FIRST_TRANSACTION = 0,
 APEX_COUNTERS_TRANSACTION_CONTEXT_MIDDLE_TRANSACTION = 1 }
Indicates the context of counters transaction. [More...](#)

enum **ApexTripClass** { **APEX_TRIP_CLASS_UNDEFINED** = 0x00, **APEX_TRIP_CLASS_FIRST_CLASS** = 0x01, **APEX_TRIP_CLASS_SECOND_CLASS** = 0x02, **APEX_TRIP_CLASS_MAX_VALUE** = 0x03 }
Identifies the type of class restriction. [More...](#)

enum	ApexContractDurationType { APEX_CONTRACT_DURATION_TYPE_NO_LIMIT = 0x00, APEX_CONTRACT_DURATION_TYPE_LAST_DAY_OF_YEAR = 0x01, APEX_CONTRACT_DURATION_TYPE_MONTHS = 0x02, APEX_CONTRACT_DURATION_TYPE_MAX_VALUE = 0x03, APEX_CONTRACT_DURATION_TYPE_HOURS = 0x04, APEX_CONTRACT_DURATION_TYPE_HALF_HOURS = 0x05, APEX_CONTRACT_DURATION_TYPE_MINUTES = 0x06, APEX_CONTRACT_DURATION_TYPE_MAX_VALUE = 0x07 }
	Contract duration type. More...
enum	ApexTripDurationType { APEX_TRIP_DURATION_TYPE_END_OF_EXPLORATION = 0x00, APEX_TRIP_DURATION_TYPE_CURRENT_TRIP = 0x01, APEX_TRIP_DURATION_TYPE_MONTHS = 0x02, APEX_TRIP_DURATION_TYPE_DAYS = 0x03, APEX_TRIP_DURATION_TYPE_HOURS = 0x04, APEX_TRIP_DURATION_TYPE_HALF_HOURS = 0x05, APEX_TRIP_DURATION_TYPE_MINUTES = 0x06, APEX_TRIP_DURATION_TYPE_END_OF_WEEK = 0x07, APEX_TRIP_DURATION_TYPE_MAX_VALUE = 0x08 }
	Trip duration type. More...
enum	ApexUnitType { APEX_UNIT_TYPE_NONE = 0x00, APEX_UNIT_TYPE_TRIPS = 0x01, APEX_UNIT_TYPE_STORED_VALUE = 0x02, APEX_UNIT_TYPE_MAX_VALUE = 0x03 }
	Counter unit type. More...
enum	ApexMaterializationType { APEX_MATERIALIZATION_TYPE_CONTACTLESS_ONLY = 0x00, APEX_MATERIALIZATION_TYPE_MOBILE_ONLY = 0x01, APEX_MATERIALIZATION_TYPE_BOTH = 0x02, APEX_MATERIALIZATION_TYPE_CONTACTLESS_MOBILE = 0x03, APEX_MATERIALIZATION_TYPE_OTHER = 0x04, APEX_MATERIALIZATION_TYPE_VOUCHER = 0x05, APEX_MATERIALIZATION_TYPE_MAX_VALUE = 0x06 }
	Materialization type of a product. More...
enum	ApexPreValidationStatus { APEX_PRE_VALIDATION_STATUS_UNKNOWN = 0x00, APEX_PRE_VALIDATION_STATUS_VALID = 0x01, APEX_PRE_VALIDATION_STATUS_EXPIRED = 0x02, APEX_PRE_VALIDATION_STATUS_MAX_VALUE = 0x03 }
	Contract pre-validation status. More...
enum	ApexIssueMode { APEX_ISSUE_MODE_ENVIRONMENT HOLDER_ID = 0x00, APEX_ISSUE_MODE_ENVIRONMENT_ID = 0x01, APEX_ISSUE_MODE HOLDER_ID = 0x02, APEX_ISSUE_MODE_FULL = 0x03, APEX_ISSUE_MODE_MAX_VALUE = 0x04 }
	Identifies the data structures that must written/updated during the issue operation. More...
enum	ApexStatus { APEX_STATUS_NO_ERROR = 0x0000, APEX_STATUS_CONTEXT_ERROR = 0x0001, APEX_STATUS_PARAMETER_ERROR = 0x0002, APEX_STATUS_NULL_PARAMETER = 0x0003, APEX_STATUS_INVALID_CALLBACK_ERROR = 0x0004, APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR = 0x0005, APEX_STATUS_MEMORY_ALLOCATION_ERROR = 0x0006, APEX_STATUS_BUFFER_SIZE_ERROR = 0x0007, APEX_STATUS_CONFIGURATION_FILE_PARSER_ERROR = 0x0008, APEX_STATUS_FILE_IO_ERROR = 0x0009 }

```

APEX_STATUS_API_VIVA_ERROR = 0x0009, APEX_STATUS_CARD_CLEAN = 0x000A,
APEX_STATUS_UNSUPPORTED_CARD_OPERATION_ERROR = 0x000B,
APEX_STATUS_INVALID_CARD_DATA_MODEL = 0x000C, APEX_STATUS_INVALID_CARD_MODEL = 0x000D, APEX_STATUS_CARD_NOT_DETECTED = 0x000E,
APEX_STATUS_INCORRECT_CARD_TYPE_DETECTED = 0x000F,
APEX_STATUS_CARD_READER_UNAVAILABLE = 0x0010, APEX_STATUS_CARD_READER_UNAVAILABLE = 0x0011, APEX_STATUS_SAM_READER_ERROR = 0x0012,
APEX_STATUS_CARD_READER_CONNECTION_ERROR = 0x0013,
APEX_STATUS_SAM_READER_CONNECTION_ERROR = 0x0014,
APEX_STATUS_INVALID_CARD_SAM_ASSOCIATION = 0x0015,
APEX_STATUS_INCOMPATIBLE_READER_CONFIGURATION = 0x0016,
APEX_STATUS_INVALID_PRODUCT_SELECTION = 0x0017,
APEX_STATUS_INVALID_CONFIGURATION_ID = 0x0018,
APEX_STATUS_INVALID_PRODUCT_CONFIGURATION = 0x0019,
APEX_STATUS_INVALID_CONTRACT_NUMBER = 0x001A,
APEX_STATUS_INVALID_SERVICE_LOCATION = 0x001B,
APEX_STATUS_INTERRUPTED_TRANSACTION = 0x001C, APEX_STATUS_INVALID_SIGNATURE = 0x001D, APEX_STATUS_DATAMODEL_ENCODING_OVERFLOW = 0x001E,
APEX_STATUS_OPERATION_ERROR = 0x001F,
APEX_STATUS_NO_EXPLORATION_PERIOD = 0x0020, APEX_STATUS_DATA_CONVERSION_ERROR = 0x0021, APEX_STATUS_CONFIGURATION_ERROR = 0x0022, APEX_STATUS_MISSING_CONFIGURATION = 0x0023,
APEX_STATUS_INVALID_CARD_DATA = 0x0024, APEX_STATUS_PRESELECTION_NOT_FOUND = 0x0025, APEX_STATUS_UNKNOWN_TRANSACTION_ID = 0x0026,
APEX_STATUS_LIBRARY_ALREADY_INITIALIZED_ERROR = 0x0027,
APEX_STATUS_UNSUPPORTED_PRODUCT_OPERATION_ERROR = 0x0028,
APEX_STATUS_CARD_IN_BLACKLIST = 0x0029, APEX_STATUS_CARD_INVALIDATED = 0x002A,
APEX_STATUS_LOAD_SEQUENCE_FILE_ERROR = 0x002B,
APEX_STATUS_UNSUPPORTED_SAM_OPERATION_ERROR = 0x002C,
APEX_STATUS_UNSUPPORTED_SAM_CARD_TYPE_ERROR = 0x002D,
APEX_STATUS_OPERATION_ABORTED = 0x002E, APEX_STATUS_CONTRACT_IN_GREYLIST = 0x002F,
APEX_STATUS_SAM_IN_BLACKLIST = 0x0030, APEX_STATUS_TRANSACTION_NOT_SUPPORTED = 0x0031, APEX_STATUS_INVALID_TRANSACTION = 0x0032,
APEX_STATUS_OPERATION_ACCESS_DENIED = 0x0033,
APEX_STATUS_LOCKED = 0x0034, APEX_STATUS_INVALID_KEY = 0x0035,
APEX_STATUS_MAX_VALUE = 0x0036
}

```

Status codes returned by the API-APEX functions. More...

```

enum ApexDetailedStatus {
    APEX_DETAILED_STATUS_NO_DETAIL = 0x00,
    APEX_DETAILED_STATUS_FILE_PARSER_NOT_INITIALIZED_ERROR = 0x01,
    APEX_DETAILED_STATUS_FILE_PARSER_CALLBACK_ERROR = 0x02,
    APEX_DETAILED_STATUS_FILE_OPEN_ERROR = 0x03,
    APEX_DETAILED_STATUS_FILE_READ_ERROR = 0x04,
    APEX_DETAILED_STATUS_EMPTY_FILE_ERROR = 0x05,
    APEX_DETAILED_STATUS_TECHNICAL_PARAMETERS_CONFIGURATION_FILE_ERROR = 0x06,
    APEX_DETAILED_STATUS_NETWORK_CONFIGURATION_FILE_ERROR = 0x07,
    APEX_DETAILED_STATUS_COMMERCIAL_OFFER_CONFIGURATION_FILE_ERROR = 0x08,
    APEX_DETAILED_STATUS_ACTION_LISTS_CONFIGURATION_FILE_ERROR = 0x09,
    APEX_DETAILED_STATUS_INVALID_CARD_READER = 0x0A,
    APEX_DETAILED_STATUS_INVALID_SAM_READER = 0x0B,
    APEX_DETAILED_STATUS_INPUT_DATA_CHANGED = 0x0C,
    APEX_DETAILED_STATUS_UNMET_PRODUCT_CONDITIONS = 0x0D,
    APEX_DETAILED_STATUS_UNMET_PROFILE_CONDITIONS = 0x0E,
    APEX_DETAILED_STATUS_DATA_CORRUPTION_DETECTED = 0x0F,
    APEX_DETAILED_STATUS_INVALID_CARD_PRODUCT_CONFIGURATION = 0x10,
}

```

```

APELL_DETAILED_STATUS_UNKNOWN_PRODUCT = 0x11, APELL_DETAILED_STATUS_CAI
= 0x12, APELL_DETAILED_STATUS_CARD_FULL = 0x13,
APEL_DETAILED_STATUS_OUTSIDE_SALE_PERIOD = 0x14,
APEL_DETAILED_STATUS_INVALID_TRANSACTION_TYPE = 0x15,
APEL_DETAILED_STATUS_DIFFERENT_CARD_DETECTED = 0x16,
APEL_DETAILED_STATUS_REFUND_NOT_AVAILABLE = 0x17,
APEL_DETAILED_STATUS_DIFFERENT_PRODUCT_DETECTED = 0x18,
APEL_DETAILED_STATUS_MISSING_PHYSICAL_SUPPORT_PRODUCT = 0x19,
APEL_DETAILED_STATUS_TEMPORAL_VALIDITY_OVERFLOW = 0x1A,
APEL_DETAILED_STATUS_MAX_VALIDITY_OR_UNITS_REACHED = 0x1B,
APEL_DETAILED_STATUS_LOAD_SEQUENCE_CALLBACK_ERROR = 0x1C,
APEL_DETAILED_STATUS_NON_ELIGIBLE_PRODUCT = 0x1D,
APEL_DETAILED_STATUS_DUPLICATE_CONTRACT = 0x1E,
APEL_DETAILED_STATUS_CONTRACT_ALREADY_TRANSFERRED = 0x1F,
APEL_DETAILED_STATUS_INVALID_QUANTITY = 0x20,
APEL_DETAILED_STATUS_UNEXPECTED_PRODUCT_CONFIGURATION = 0x21,
APEL_DETAILED_STATUS_MISSING_PAPER_SALE_CACHE = 0x22,
APEL_DETAILED_STATUS_DIFFERENT_CARD_DATA_DETECTED = 0x23,
APEL_DETAILED_STATUS_PRODUCT_ALREADY_USED = 0x24,
APEL_DETAILED_STATUS_NO_PENDING_INTERRUPTED_TRANSACTION = 0x25,
APEL_DETAILED_STATUS_DATA_MODEL_ERROR = 0x26,
APEL_DETAILED_STATUS_INVALID_CARD_TYPE = 0x27,
APEL_DETAILED_STATUS_ONLINE_CHECK_REJECTED = 0x28,
APEL_DETAILED_STATUS_ONLINE_CHECK_FAILED = 0x29,
APEL_DETAILED_STATUS_SAME_CONTRACT_ALREADY_LOADED_TODAY = 0x2A,
APEL_DETAILED_STATUS_CONTRACT_TEMPORAL_VALIDITY_TOO_LONG = 0x2B,
APEL_DETAILED_STATUS_UNABLE_TO_CONFIGURE_PRODUCT = 0x002C,
APEL_DETAILED_STATUS_NO_VALID_SALES_PACKAGES = 0x002D,
APEL_DETAILED_STATUS_PROFILE_ERROR = 0x002E,
APEL_DETAILED_STATUS_MISSING_ACTION_LISTS_CALLBACK = 0x002F,
APEL_DETAILED_STATUS_CHECK_BLACKLIST_CARD_CALLBACK_ERROR = 0x0030,
APEL_DETAILED_STATUS_CHECK_BLACKLIST_SAM_CALLBACK_ERROR = 0x0031,
APEL_DETAILED_STATUS_CHECK_GREYLIST_CALLBACK_ERROR = 0x0032,
APEL_DETAILED_STATUS_CHECK_WHITELIST_PROFILE_CALLBACK_ERROR = 0x0033,
APEL_DETAILED_STATUS_CHECK_WHITELIST_CARD_CALLBACK_ERROR = 0x0034,
APEL_DETAILED_STATUS_CHECK_GREENLIST_CALLBACK_ERROR = 0x0035,
APEL_DETAILED_STATUS_CARD_READER_COUNT_ERROR = 0x0036,
APEL_DETAILED_STATUS_SAM_READER_COUNT_ERROR = 0x0037,
APEL_DETAILED_STATUS_CARD_READER_ID_ALREADY_EXISTS_ERROR = 0x0038,
APEL_DETAILED_STATUS_SAM_READER_ID_ALREADY_EXISTS_ERROR = 0x0039,
APEL_DETAILED_STATUS_NO_VALID_ZONE_SELECTION = 0x003A,
APEL_DETAILED_STATUS_NO_VALID_SPATIAL_VALIDITY_SELECTION = 0x003B,
APEL_DETAILED_STATUS_CONTRACT_VALIDITY_EXCEEDS_CARD_VALIDITY = 0x003C,
APEL_DETAILED_STATUS_PRODUCT_ALREADY_EXISTS = 0x003D,
APEL_DETAILED_STATUS_PRODUCT_TO_RELOAD_MISSING = 0x003E,
APEL_DETAILED_STATUS_FILE_PARSER_CHECKSUM_ERROR = 0x003F,
APEL_DETAILED_STATUS_FILE_PARSER_INVALID_SECURITY_HASH = 0x0040,
APEL_DETAILED_STATUS_CARD_UNFIT_FOR_USE = 0x0041,
APEL_DETAILED_STATUS_REQUIRED_PRODUCT_NOT_FOUND = 0x0042,
APEL_DETAILED_STATUS_REQUIRED_PRODUCT_NOT_VALID_TEMPORALLY = 0x0043,
APEL_DETAILED_STATUS_REQUIRED_PRODUCT_DEPENDENCY_FOUND = 0x0044,
APEL_DETAILED_STATUS_INVALID_LINE = 0x0045, APELL_DETAILED_STATUS_INVALID_
0x0046, APELL_DETAILED_STATUS_INVALID_STOP = 0x0047,
APEL_DETAILED_STATUS_MAX_VALUE = 0x0048
}
Detailed error codes. More...

```

```
enum ApexLowLevelErrorType { APEL_LOW_LEVEL_ERROR_TYPE_NONE = 0x00,
```

```
APEX_LOW_LEVEL_ERROR_TYPE_CONFIG_FILE_PARSER = 0x01,  
APEX_LOW_LEVEL_ERROR_TYPE_APIVIVA = 0x02, APEX_LOW_LEVEL_ERROR_TYPE_I  
= 0x03 }
```

Identifies how the low level error structure should be interpreted. [More...](#)

```
enum ApexTemporalValidityStartType {  
    APEX_TEMPORAL_VALIDITY_START_TYPE_FIRST_DAY_OF_MONTH = 0x00,  
    APEX_TEMPORAL_VALIDITY_START_TYPE_FIRST_DAY_OF_YEAR = 0x01,  
    APEX_TEMPORAL_VALIDITY_START_TYPE_CUSTOMER_DEFINED = 0x02,  
    APEX_TEMPORAL_VALIDITY_START_TYPE_FIRST_VALIDATION = 0x03,  
    APEX_TEMPORAL_VALIDITY_START_TYPE_PURCHASE_DATE = 0x04,  
    APEX_TEMPORAL_VALIDITY_START_TYPE_MAX_VALUE = 0x05  
}
```

Identifies the type of initial validity of the product. [More...](#)

```
enum ApexOperationType {  
    APEX_OPERATION_TYPE_READ = 0x00, APEX_OPERATION_TYPE_SALE = 0x01,  
    APEX_OPERATION_TYPE_LOAD = 0x02, APEX_OPERATION_TYPE_RELOAD = 0x03,  
    APEX_OPERATION_TYPE_TRANSFER = 0x04, APEX_OPERATION_TYPE_PERSONALIZA  
APEX_OPERATION_TYPE_INVALIDATION = 0x06, APEX_OPERATION_TYPE_REHABILITA  
APEX_OPERATION_TYPE_VALIDATION = 0x08, APEX_OPERATION_TYPE_CONTROL = 0  
APEX_OPERATION_TYPE_REMOVE = 0x0A, APEX_OPERATION_TYPE_PRE_SELECTION  
APEX_OPERATION_TYPE_UNDO = 0x0C, APEX_OPERATION_TYPE_TRIP_REFUND = 0x  
APEX_OPERATION_TYPE_CANCEL = 0x0E, APEX_OPERATION_TYPE_MAX_VALUE = 0x0  
}
```

Type of operation that can be performed on a product. [More...](#)

```
enum ApexUtilizationMode {  
    APEX_UTILIZATION_MODE_TRANSPORT_ENTRANCE = 0x00,  
    APEX_UTILIZATION_MODE_TRANSPORT_EXIT = 0x01, APEX_UTILIZATION_MODE_PARK  
APEX_UTILIZATION_MODE_PARKING_METER = 0x03,  
    APEX_UTILIZATION_MODE_SPECIAL_CHANNEL = 0x04, APEX_UTILIZATION_MODE_MA  
0x05  
}
```

Identifies the utilization mode of the product. [More...](#)

```
enum ApexConfigurationMode { APEX_CONFIGURATION_MODE_OPERATOR = 0x00,  
APEX_CONFIGURATION_MODE_FULL = 0x01, APEX_CONFIGURATION_MODE_MAX_VAL  
Identifies the how the configuration files are loaded by API-APEX. More...
```

```
enum ApexControlType { APEX_CONTROL_TYPE_UNDEFINED = 0x00, APEX_CONTROL_TYPE_  
= 0x01, APEX_CONTROL_TYPE_WHITELIST = 0x02, APEX_CONTROL_TYPE_MAX_VALUE  
Identifies the control type. More...
```

```
enum ApexControlWhitelistStatus {  
    APEX_CONTROL_WHITELIST_STATUS_UNKNOWN = 0x00,  
    APEX_CONTROL_WHITELIST_STATUS_VALID = 0x01,  
    APEX_CONTROL_WHITELIST_STATUS_INVALID = 0x02,  
    APEX_CONTROL_WHITELIST_STATUS_MAYBE_VALID = 0x03,  
    APEX_CONTROL_WHITELIST_STATUS_VALID_BUT_NOT_VALIDATED = 0x04,  
    APEX_CONTROL_WHITELIST_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED = 0x05,  
    APEX_CONTROL_WHITELIST_STATUS_MAX_VALUE = 0x06  
}
```

Control whitelist status. [More...](#)

```
enum ApexControlStatus {
```

```
APEX_CONTROL_STATUS_UNDETERMINED = 0x00, APEX_CONTROL_STATUS_VALID =  
APEX_CONTROL_STATUS_INVALID = 0x02, APEX_CONTROL_STATUS_MAYBE_VALID = 0x03,  
APEX_CONTROL_STATUS_MAX_VALUE = 0x04  
}  
Control status. More...
```

Macro Definition Documentation

◆ K_APEX_ACCESS_KEY_MAX_LENGTH

```
#define K_APEX_ACCESS_KEY_MAX_LENGTH 256
```

Maximum length of the access key string.

◆ K_APEX_ACCESS_KEY_MAX_SIZE

```
#define K_APEX_ACCESS_KEY_MAX_SIZE K_APEX_ACCESS_KEY_MAX_LENGTH + 1
```

Maximum size for the access key string buffer (NULL terminator included).

◆ K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_LENGTH

```
#define K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_LENGTH 36
```

◆ K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_SIZE

```
#define  
K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_SIZE K_APEX_ACTION_LISTS_AUTHORIZA  
+ 1
```

◆ K_APEX_ACTION_LISTS_ITEM_ID_MAX_LENGTH

```
#define K_APEX_ACTION_LISTS_ITEM_ID_MAX_LENGTH 36
```

◆ K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE

```
#define  
K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE K_APEX_ACTION_LISTS_ITEM_ID_MAX_LENGTH  
+ 1
```

◆ K_APEX_BINARY_MAX_SIZE

```
#define  
K_APEX_BINARY_MAX_SIZE K_VIVA_CONTRACT_AUX_COUNTER_BINARY_MAX_SIZE
```

Maximum size of a binary byte array.

◆ **K_APEX_BLOCK_ID_MAX_LENGTH**

```
#define K_APEX_BLOCK_ID_MAX_LENGTH 36
```

Maximum length of the vehicle block ID string.

◆ **K_APEX_BLOCK_ID_MAX_SIZE**

```
#define K_APEX_BLOCK_ID_MAX_SIZE K_APEX_BLOCK_ID_MAX_LENGTH + 1
```

Maximum size for the vehicle block ID string buffer (NULL terminator included).

◆ **K_APEX_CARD_PIN_CODE_MAX_SIZE**

```
#define K_APEX_CARD_PIN_CODE_MAX_SIZE 4
```

Maximum size for the card PIN code.

◆ **K_APEX_CARD_TYPE_ID_MAX_LENGTH**

```
#define K_APEX_CARD_TYPE_ID_MAX_LENGTH 36
```

Maximum length of the card type ID string.

◆ **K_APEX_CARD_TYPE_ID_MAX_SIZE**

```
#define K_APEX_CARD_TYPE_ID_MAX_SIZE K_APEX_CARD_TYPE_ID_MAX_LENGTH + 1
```

Maximum size for the card type ID string buffer (NULL terminator included).

◆ **K_APEX_CHANNEL_ID_MAX_LENGTH**

```
#define K_APEX_CHANNEL_ID_MAX_LENGTH 36
```

Maximum length of the channel ID string.

◆ **K_APEX_CHANNEL_ID_MAX_SIZE**

```
#define K_APEX_CHANNEL_ID_MAX_SIZE  K_APEX_CHANNEL_ID_MAX_LENGTH + 1
```

Maximum size for the channel ID string buffer (NULL terminator included).

◆ **K_APEX_CONFIGURATION_ID_MAX_LENGTH**

```
#define K_APEX_CONFIGURATION_ID_MAX_LENGTH 36
```

Maximum length of the product configuration id string.

◆ **K_APEX_CONFIGURATION_ID_MAX_SIZE**

```
#define  
K_APEX_CONFIGURATION_ID_MAX_SIZE  K_APEX_CONFIGURATION_ID_MAX_LENGTH + 1
```

Maximum size for the product configuration id string buffer (NULL terminator included).

◆ **K_APEX_CONTRACTS_MAX_SIZE**

```
#define K_APEX_CONTRACTS_MAX_SIZE  K_MAX_CONTRACT_GEN2
```

Maximum number of contracts for Apex data structures.

◆ **K_APEX_CSV_MAX_LENGTH**

```
#define K_APEX_CSV_MAX_LENGTH 2048
```

Size of a csv data.

◆ **K_APEX_CSV_MAX_SIZE**

```
#define K_APEX_CSV_MAX_SIZE  K_APEX_CSV_MAX_LENGTH + 1
```

Size of a csv string buffer.

◆ **K_APEX_DEVICE_ID_MAX_LENGTH**

```
#define K_APEX_DEVICE_ID_MAX_LENGTH 40
```

Maximum length of the device (POS) ID string.

◆ **K_APEX_DEVICE_ID_MAX_SIZE**

```
#define K_APEX_DEVICE_ID_MAX_SIZE K_APEX_DEVICE_ID_MAX_LENGTH + 1
```

Maximum size for the device (POS) ID string buffer (NULL terminator included).

◆ **K_APEX_DOCUMENT_NAME_MAX_LENGTH**

```
#define K_APEX_DOCUMENT_NAME_MAX_LENGTH 64
```

Maximum length of the document name string.

◆ **K_APEX_DOCUMENT_NAME_MAX_SIZE**

```
#define K_APEX_DOCUMENT_NAME_MAX_SIZE K_APEX_DOCUMENT_NAME_MAX_LENGTH + 1
```

Maximum size for the document name string buffer (NULL terminator included).

◆ **K_APEX_DOCUMENT_OBS_MAX_LENGTH**

```
#define K_APEX_DOCUMENT_OBS_MAX_LENGTH 1024
```

Maximum length of the document observation string.

◆ **K_APEX_DOCUMENT_OBS_MAX_SIZE**

```
#define K_APEX_DOCUMENT_OBS_MAX_SIZE K_APEX_DOCUMENT_OBS_MAX_LENGTH + 1
```

Maximum size for the document observation string buffer (NULL terminator included).

◆ **K_APEX_DUTY_ID_MAX_LENGTH**

```
#define K_APEX_DUTY_ID_MAX_LENGTH 36
```

Maximum length of the driver duty ID string.

◆ K_APEX_DUTY_ID_MAX_SIZE

```
#define K_APEX_DUTY_ID_MAX_SIZE K_APEX_DUTY_ID_MAX_LENGTH + 1
```

Maximum size for the driver duty ID string buffer (NULL terminator included).

◆ K_APEX_EXTRA_JOURNEY_ID_MAX_LENGTH

```
#define K_APEX_EXTRA_JOURNEY_ID_MAX_LENGTH 36
```

Maximum length of the extra journey ID string.

◆ K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE

```
#define  
K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE K_APEX_EXTRA_JOURNEY_ID_MAX_LENGTH + 1
```

Maximum size for the extra journey ID string buffer (NULL terminator included).

◆ K_APEX_FILE_PATH_MAX_LENGTH

```
#define K_APEX_FILE_PATH_MAX_LENGTH K_OS_FILE_PATH_MAX_SIZE - 1
```

Maximum length of a file path.

Summary Global definitions used by the several layers that compose the API-APEX.

Remarks **Preliminary Note:**

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Contents:

This document, a header file format (C language), contains the global definitions used by the several layers that compose API-APEX.

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◆ K_APEX_FILE_PATH_MAX_SIZE

```
#define K_APEX_FILE_PATH_MAX_SIZE K_OS_FILE_PATH_MAX_SIZE
```

Maximum size of a file path length (NULL terminator included).

◆ K_APEX_FILE_VERSION_MAX_LENGTH

```
#define K_APEX_FILE_VERSION_MAX_LENGTH 7
```

Maximum length of the file version string.

◆ K_APEX_FILE_VERSION_MAX_SIZE

```
#define K_APEX_FILE_VERSION_MAX_SIZE K_APEX_FILE_VERSION_MAX_LENGTH + 1
```

Maximum size for the file version string buffer (NULL terminator included).

◆ K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_LENGTH

```
#define K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_LENGTH 255
```

Maximum length of the fine attribute description string.

◆ K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_SIZE

```
#define  
K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_SIZE K_APEX_FINE_ATTRIBUTE_DESCRIPTION  
+ 1
```

Maximum size for the fine attribute description string buffer (NULL terminator included).

◆ **K_APEX_FINE_ATTRIBUTE_ID_MAX_LENGTH**

```
#define K_APEX_FINE_ATTRIBUTE_ID_MAX_LENGTH 36
```

Maximum length of the fine attribute id string.

◆ **K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE**

```
#define  
K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE K_APEX_FINE_ATTRIBUTE_ID_MAX_LENGTH + 1
```

Maximum size for the fine attribute id string buffer (NULL terminator included).

◆ **K_APEX_FINE_DESCRIPTION_MAX_LENGTH**

```
#define K_APEX_FINE_DESCRIPTION_MAX_LENGTH 255
```

Maximum length of the fine description string.

◆ **K_APEX_FINE_DESCRIPTION_MAX_SIZE**

```
#define  
K_APEX_FINE_DESCRIPTION_MAX_SIZE K_APEX_FINE_DESCRIPTION_MAX_LENGTH + 1
```

Maximum size for the fine description string buffer (NULL terminator included).

◆ **K_APEX_FINE_ID_MAX_LENGTH**

```
#define K_APEX_FINE_ID_MAX_LENGTH 36
```

Maximum length of the fine id string.

◆ **K_APEX_FINE_ID_MAX_SIZE**

```
#define K_APEX_FINE_ID_MAX_SIZE K_APEX_FINE_ID_MAX_LENGTH + 1
```

Maximum size for the fine id string buffer (NULL terminator included).

◆ **K_APEX_GENERIC_ID_MAX_LENGTH**

```
#define K_APEX_GENERIC_ID_MAX_LENGTH 36
```

Maximum length of the generic ID string.

- ◆ **K_APEX_GENERIC_ID_MAX_SIZE**

```
#define K_APEX_GENERIC_ID_MAX_SIZE K_APEX_GENERIC_ID_MAX_LENGTH + 1
```

Maximum size for the generic ID string buffer (NULL terminator included).

- ◆ **K_APEX HOLDER NAME MAX LENGTH**

```
#define K_APEX HOLDER NAME MAX LENGTH K_VIVA HOLDER ID NAME MAX LENGTH - 1
```

Maximum size for the holder name string.

- ◆ **K_APEX HOLDER NAME MAX SIZE**

```
#define K_APEX HOLDER NAME MAX SIZE K_VIVA HOLDER ID NAME MAX LENGTH
```

Maximum size for the holder name string (NULL terminator included).

- ◆ **K_APEX_IDENTITY_NUMBER_MAX_LENGTH**

```
#define K_APEX_IDENTITY_NUMBER_MAX_LENGTH 32
```

Maximum length of the identity number string.

- ◆ **K_APEX_IDENTITY_NUMBER_MAX_SIZE**

```
#define K_APEX_IDENTITY_NUMBER_MAX_SIZE K_APEX_IDENTITY_NUMBER_MAX_LENGTH + 1
```

Maximum size for the identity number string buffer (NULL terminator included).

- ◆ **K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_LENGTH**

```
#define K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_LENGTH 255
```

Maximum length of the infraction description string.

◆ **K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_SIZE**

```
#define  
K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_SIZE K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_SIZE + 1
```

Maximum size for the infraction description string buffer (NULL terminator included).

◆ **K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_LENGTH**

```
#define K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_LENGTH 36
```

Maximum length of the infraction attribute id string.

◆ **K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE**

```
#define  
K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE + 1
```

Maximum size for the infraction attribute id string buffer (NULL terminator included).

◆ **K_APEX_INFRACTION_DESCRIPTION_MAX_LENGTH**

```
#define K_APEX_INFRACTION_DESCRIPTION_MAX_LENGTH 255
```

Maximum length of the infraction description string.

◆ **K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE**

```
#define  
K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE + 1
```

Maximum size for the infraction description string buffer (NULL terminator included).

◆ **K_APEX_INFRACTION_ID_MAX_LENGTH**

```
#define K_APEX_INFRACTION_ID_MAX_LENGTH 36
```

Maximum length of the infraction id string.

◆ **K_APEX_INFRACTION_ID_MAX_SIZE**

```
#define K_APEX_INFRACTION_ID_MAX_SIZE K_APEX_INFRACTION_ID_MAX_LENGTH + 1
```

Maximum size for the infraction id string buffer (NULL terminator included).

◆ **K_APEX_INFRACTION_NUMBER_MAX_LENGTH**

```
#define K_APEX_INFRACTION_NUMBER_MAX_LENGTH 20
```

Maximum length of the infraction number string.

◆ **K_APEX_INFRACTION_NUMBER_MAX_SIZE**

```
#define  
K_APEX_INFRACTION_NUMBER_MAX_SIZE K_APEX_INFRACTION_NUMBER_MAX_LENGTH  
+ 1
```

Maximum size for the infraction number buffer (NULL terminator included).

◆ **K_APEX_INFRACTION_PLACE_MAX_LENGTH**

```
#define K_APEX_INFRACTION_PLACE_MAX_LENGTH 64
```

Maximum length of the infraction place string.

◆ **K_APEX_INFRACTION_PLACE_MAX_SIZE**

```
#define  
K_APEX_INFRACTION_PLACE_MAX_SIZE K_APEX_INFRACTION_PLACE_MAX_LENGTH + 1
```

Maximum size for the infraction place string buffer (NULL terminator included).

◆ **K_APEX_INFRACTION_PROCEDURE_MAX_LENGTH**

```
#define K_APEX_INFRACTION_PROCEDURE_MAX_LENGTH 255
```

Maximum length of the infraction procedure string.

◆ K_APEX_INFRACTION_PROCEDURE_MAX_SIZE

```
#define  
K_APEX_INFRACTION_PROCEDURE_MAX_SIZE K_APEX_INFRACTION_PROCEDURE_MAX_LENGTH  
+ 1
```

Maximum size for the infraction procedure string buffer (NULL terminator included).

◆ K_APEX_INVOICE_NUMBER_MAX_LENGTH

```
#define K_APEX_INVOICE_NUMBER_MAX_LENGTH 30
```

Maximum length of the invoice number string.

◆ K_APEX_INVOICE_NUMBER_MAX_SIZE

```
#define K_APEX_INVOICE_NUMBER_MAX_SIZE K_APEX_INVOICE_NUMBER_MAX_LENGTH +  
1
```

Maximum size for the invoice number string buffer (NULL terminator included).

◆ K_APEX_ISSUER_DATA_MAX_SIZE

```
#define K_APEX_ISSUER_DATA_MAX_SIZE K_VIVA_ISSUER_DATA_MAX_LENGTH
```

Maximum size for the issuer data.

◆ K_APEX_JOURNEY_ID_MAX_LENGTH

```
#define K_APEX_JOURNEY_ID_MAX_LENGTH 36
```

Maximum length of the journey ID string.

◆ K_APEX_JOURNEY_ID_MAX_SIZE

```
#define K_APEX_JOURNEY_ID_MAX_SIZE K_APEX_JOURNEY_ID_MAX_LENGTH + 1
```

Maximum size for the journey ID string buffer (NULL terminator included).

◆ **K_APEX_LIBRARY_VERSION_MAX_LENGTH**

```
#define K_APEX_LIBRARY_VERSION_MAX_LENGTH 11
```

◆ **K_APEX_LIBRARY_VERSION_MAX_SIZE**

```
#define K_APEX_LIBRARY_VERSION_MAX_SIZE K_APEX_LIBRARY_VERSION_MAX_LENGTH  
+ 1
```

Maximum size for the library version string buffer (NULL terminator included).

◆ **K_APEX_LINE_ID_MAX_LENGTH**

```
#define K_APEX_LINE_ID_MAX_LENGTH 36
```

Maximum length of the line ID string.

◆ **K_APEX_LINE_ID_MAX_SIZE**

```
#define K_APEX_LINE_ID_MAX_SIZE K_APEX_LINE_ID_MAX_LENGTH + 1
```

Maximum size for the line ID string buffer (NULL terminator included).

◆ **K_APEX_LINE_NAME_MAX_LENGTH**

```
#define K_APEX_LINE_NAME_MAX_LENGTH 50
```

◆ **K_APEX_LINE_NAME_MAX_SIZE**

```
#define K_APEX_LINE_NAME_MAX_SIZE K_APEX_LINE_NAME_MAX_LENGTH + 1
```

◆ **K_APEX_LOYALTY_RECORDS_MAX_SIZE**

```
#define K_APEX_LOYALTY_RECORDS_MAX_SIZE 8
```

Maximum number of loyalty data records.

◆ **K_APEX_MAX_AVAILABLE_ZONES_COUNT**

```
#define K_APEX_MAX_AVAILABLE_ZONES_COUNT 135
```

Maximum number of available zones.

- ◆ **K_APEX_NETWORK_ID_MAX_LENGTH**

```
#define K_APEX_NETWORK_ID_MAX_LENGTH 36
```

Maximum length of the network ID string.

- ◆ **K_APEX_NETWORK_ID_MAX_SIZE**

```
#define K_APEX_NETWORK_ID_MAX_SIZE K_APEX_NETWORK_ID_MAX_LENGTH + 1
```

Maximum size for the network ID string buffer (NULL terminator included).

- ◆ **K_APEX_OFFENDER_ADDRESS_MAX_LENGTH**

```
#define K_APEX_OFFENDER_ADDRESS_MAX_LENGTH 128
```

Maximum length of the offender address string.

- ◆ **K_APEX_OFFENDER_ADDRESS_MAX_SIZE**

```
#define  
K_APEX_OFFENDER_ADDRESS_MAX_SIZE K_APEX_OFFENDER_ADDRESS_MAX_LENGTH  
+ 1
```

Maximum size for the offender address string buffer (NULL terminator included).

- ◆ **K_APEX_OFFENDER_NAME_MAX_LENGTH**

```
#define K_APEX_OFFENDER_NAME_MAX_LENGTH 128
```

Maximum length of the offender name string.

- ◆ **K_APEX_OFFENDER_NAME_MAX_SIZE**

```
#define K_APEX_OFFENDER_NAME_MAX_SIZE K_APEX_OFFENDER_NAME_MAX_LENGTH +  
1
```

Maximum size for the offender name string buffer (NULL terminator included).

◆ **K_APEX_OFFENDER_POSTAL_CODE_MAX_LENGTH**

```
#define K_APEX_OFFENDER_POSTAL_CODE_MAX_LENGTH 8
```

Maximum length of the offender postal code string.

◆ **K_APEX_OFFENDER_POSTAL_CODE_MAX_SIZE**

```
#define  
K_APEX_OFFENDER_POSTAL_CODE_MAX_SIZE K_APEX_OFFENDER_POSTAL_CODE_MAX_L  
+ 1
```

Maximum size for the offender postal code string buffer (NULL terminator included).

◆ **K_APEX_OPERATION_PLAN_ID_MAX_LENGTH**

```
#define K_APEX_OPERATION_PLAN_ID_MAX_LENGTH 36
```

Maximum length of the operation plan ID string.

◆ **K_APEX_OPERATION_PLAN_ID_MAX_SIZE**

```
#define  
K_APEX_OPERATION_PLAN_ID_MAX_SIZE K_APEX_OPERATION_PLAN_ID_MAX_LENGTH +  
1
```

Maximum size for the operation plan ID string buffer (NULL terminator included).

◆ **K_APEX_OPERATOR_ID_MAX_LENGTH**

```
#define K_APEX_OPERATOR_ID_MAX_LENGTH 36
```

Maximum length of the operator ID string.

◆ **K_APEX_OPERATOR_ID_MAX_SIZE**

```
#define K_APEX_OPERATOR_ID_MAX_SIZE K_APEX_OPERATOR_ID_MAX_LENGTH + 1
```

Maximum size for the operator ID string buffer (NULL terminator included).

◆ **K_APEX_OPERATOR_NAME_MAX_LENGTH**

```
#define K_APEX_OPERATOR_NAME_MAX_LENGTH 50
```

Maximum length of the operator name string.

◆ **K_APEX_OPERATOR_NAME_MAX_SIZE**

```
#define K_APEX_OPERATOR_NAME_MAX_SIZE K_APEX_OPERATOR_NAME_MAX_LENGTH +  
1
```

Maximum size for the operator name string buffer (NULL terminator included).

◆ **K_APEX_OPERATOR_SHORT_NAME_MAX_LENGTH**

```
#define K_APEX_OPERATOR_SHORT_NAME_MAX_LENGTH 10
```

Maximum length of the operator short name string.

◆ **K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE**

```
#define  
K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE K_APEX_OPERATOR_SHORT_NAME_MAX_LENGTH  
+ 1
```

Maximum size for the operator short name string buffer (NULL terminator included).

◆ **K_APEX_PAPER_TICKET_NUMBER_MAX_LENGTH**

```
#define K_APEX_PAPER_TICKET_NUMBER_MAX_LENGTH 20
```

Maximum length of the ticket number text string.

◆ **K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE**

```
#define  
K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE K_APEX_PAPER_TICKET_NUMBER_MAX_LENGTH  
+ 1
```

Maximum size for the ticket number text buffer (NULL terminator included).

◆ **K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_LENGTH**

```
#define K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_LENGTH 136
```

Maximum length of the paper ticket security data text string.

◆ **K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE**

```
#define  
K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE K_APEX_PAPER_TICKET_SECURITY_D  
+1
```

Maximum size for the paper ticket security data text buffer (NULL terminator included).

◆ **K_APEX_PATTERN_ID_MAX_LENGTH**

```
#define K_APEX_PATTERN_ID_MAX_LENGTH 36
```

Maximum length of the pattern ID string.

◆ **K_APEX_PATTERN_ID_MAX_SIZE**

```
#define K_APEX_PATTERN_ID_MAX_SIZE K_APEX_PATTERN_ID_MAX_LENGTH + 1
```

Maximum size for the pattern ID string buffer (NULL terminator included).

◆ **K_APEX_PATTERN_NAME_MAX_LENGTH**

```
#define K_APEX_PATTERN_NAME_MAX_LENGTH 50
```

◆ **K_APEX_PATTERN_NAME_MAX_SIZE**

```
#define K_APEX_PATTERN_NAME_MAX_SIZE K_APEX_PATTERN_NAME_MAX_LENGTH + 1
```

◆ **K_APEX_PERSONALIZATION_ID_MAX_LENGTH**

```
#define K_APEX_PERSONALIZATION_ID_MAX_LENGTH 36
```

◆ **K_APEX_PERSONALIZATION_ID_MAX_SIZE**

```
#define  
K_APEX_PERSONALIZATION_ID_MAX_SIZE K_APEX_PERSONALIZATION_ID_MAX_LENGTH  
+ 1
```

◆ **K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_LENGTH**

```
#define K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_LENGTH 50
```

Maximum length for product category descriptions.

◆ **K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE**

```
#define  
K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE K_APEX_PRODUCT_CATEGORY_D  
+ 1
```

Maximum size for product category description buffers(NULL terminator included).

◆ **K_APEX_PRODUCT_ID_MAX_LENGTH**

```
#define K_APEX_PRODUCT_ID_MAX_LENGTH 36
```

Maximum length of the product ID string.

◆ **K_APEX_PRODUCT_ID_MAX_SIZE**

```
#define K_APEX_PRODUCT_ID_MAX_SIZE K_APEX_PRODUCT_ID_MAX_LENGTH + 1
```

Maximum size for the product ID string buffer (NULL terminator included).

◆ **K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_LENGTH**

```
#define K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_LENGTH 36
```

◆ **K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE**

```
#define  
K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE K_APEX_PRODUCT_MATRIX_ELEMENT  
+ 1
```

◆ **K_APEX_PRODUCT_NAME_MAX_LENGTH**

```
#define K_APEX_PRODUCT_NAME_MAX_LENGTH 50
```

Maximum length of the product / contract name string.

◆ **K_APEX_PRODUCT_NAME_MAX_SIZE**

```
#define K_APEX_PRODUCT_NAME_MAX_SIZE K_APEX_PRODUCT_NAME_MAX_LENGTH + 1
```

Maximum size for the product / contract name string buffer(NULL terminator included).

◆ **K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_LENGTH**

```
#define K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_LENGTH 36
```

Maximum length of the parameter text value string.

◆ **K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_SIZE**

```
#define  
K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_SIZE K_APEX_PRODUCT_PARAM_TEXT_VAL  
+ 1
```

Maximum size for the parameter text value buffer (NULL terminator included).

◆ **K_APEX_PROFILE_ID_MAX_LENGTH**

```
#define K_APEX_PROFILE_ID_MAX_LENGTH 36
```

Maximum length of the profile ID string.

◆ **K_APEX_PROFILE_ID_MAX_SIZE**

```
#define K_APEX_PROFILE_ID_MAX_SIZE K_APEX_PROFILE_ID_MAX_LENGTH + 1
```

Maximum size for the profile ID string buffer (NULL terminator included).

◆ **K_APEX_PROFILE_NAME_MAX_LENGTH**

```
#define K_APEX_PROFILE_NAME_MAX_LENGTH 50
```

Maximum length of the operator name string.

◆ K_APEX_PROFILE_NAME_MAX_SIZE

```
#define K_APEX_PROFILE_NAME_MAX_SIZE K_APEX_PROFILE_NAME_MAX_LENGTH + 1
```

Maximum size for the operator name string buffer (NULL terminator included).

◆ K_APEX_PROFILES_MAX_SIZE

```
#define K_APEX_PROFILES_MAX_SIZE K_VIVA HOLDER PROFILE ENTRY MAX LENGTH
```

Maximum number of profiles.

◆ K_APEX_READER_ADDRESS_MAX_LENGTH

```
#define K_APEX_READER_ADDRESS_MAX_LENGTH K_COMM_DEV_NAME_MAX_LENGTH - 1
```

Maximum length of a reader address.

◆ K_APEX_READER_ADDRESS_MAX_SIZE

```
#define  
K_APEX_READER_ADDRESS_MAX_SIZE K_APEX_READER_ADDRESS_MAX_LENGTH + 1
```

Maximum size of a reader address (NULL terminator included).

◆ K_APEX_SALES_PACKAGE_ID_MAX_LENGTH

```
#define K_APEX_SALES_PACKAGE_ID_MAX_LENGTH 36
```

Maximum length of the sales package ID string.

◆ K_APEX_SALES_PACKAGE_ID_MAX_SIZE

```
#define  
K_APEX_SALES_PACKAGE_ID_MAX_SIZE K_APEX_SALES_PACKAGE_ID_MAX_LENGTH + 1
```

Maximum size for the sales package ID string buffer (NULL terminator included).

◆ **K_APEX_SAM_TYPE_ID_MAX_LENGTH**

```
#define K_APEX_SAM_TYPE_ID_MAX_LENGTH 36
```

Maximum length of the sam type ID string.

◆ **K_APEX_SAM_TYPE_ID_MAX_SIZE**

```
#define K_APEX_SAM_TYPE_ID_MAX_SIZE K_APEX_SAM_TYPE_ID_MAX_LENGTH + 1
```

Maximum size for the sam type ID string buffer (NULL terminator included).

◆ **K_APEX_SELECT_APP_INFO_MAX_SIZE**

```
#define K_APEX_SELECT_APP_INFO_MAX_SIZE K_INFO_MAX_LENGTH
```

Maximum size of the detected card info byte array.

◆ **K_APEX_SPATIAL_VALIDITY_ID_MAX_LENGTH**

```
#define K_APEX_SPATIAL_VALIDITY_ID_MAX_LENGTH 36
```

◆ **K_APEX_SPATIAL_VALIDITY_ID_MAX_SIZE**

```
#define  
K_APEX_SPATIAL_VALIDITY_ID_MAX_SIZE K_APEX_SPATIAL_VALIDITY_ID_MAX_LENGTH +  
1
```

◆ **K_APEX_SPATIAL_VALIDITY_MAX_SIZE**

```
#define K_APEX_SPATIAL_VALIDITY_MAX_SIZE K_VIVA_SPATIAL_VALIDITY_MAX_RECORDS
```

Maximum number of spatial validity records.

◆ **K_APEX_STOP_ID_MAX_LENGTH**

```
#define K_APEX_STOP_ID_MAX_LENGTH 36
```

Maximum length of the stop ID string.

◆ **K_APEX_STOP_ID_MAX_SIZE**

```
#define K_APEX_STOP_ID_MAX_SIZE K_APEX_STOP_ID_MAX_LENGTH + 1
```

Maximum size for the stop ID string buffer (NULL terminator included).

◆ **K_APEX_STOP_NAME_MAX_LENGTH**

```
#define K_APEX_STOP_NAME_MAX_LENGTH 50
```

Maximum length for stop names.

◆ **K_APEX_STOP_NAME_MAX_SIZE**

```
#define K_APEX_STOP_NAME_MAX_SIZE K_APEX_STOP_NAME_MAX_LENGTH + 1
```

Maximum size for stop name buffers (NULL terminator included).

◆ **K_APEX_TAX_ID_MAX_LENGTH**

```
#define K_APEX_TAX_ID_MAX_LENGTH 36
```

Maximum length of the sales package ID string.

◆ **K_APEX_TAX_ID_MAX_SIZE**

```
#define K_APEX_TAX_ID_MAX_SIZE K_APEX_TAX_ID_MAX_LENGTH + 1
```

Maximum size for the sales package ID string buffer (NULL terminator included).

◆ **K_APEX_TRANSACTION_ID_MAX_LENGTH**

```
#define K_APEX_TRANSACTION_ID_MAX_LENGTH 36
```

Maximum length of the transaction id string.

◆ **K_APEX_TRANSACTION_ID_MAX_SIZE**

```
#define K_APEX_TRANSACTION_ID_MAX_SIZE K_APEX_TRANSACTION_ID_MAX_LENGTH +  
1
```

Maximum size for the transaction id string buffer (NULL terminator included).

◆ K_APEX_TRANSPORT_SERVICE_TYPOLOGY_MAX_LENGTH

```
#define K_APEX_TRANSPORT_SERVICE_TYPOLOGY_MAX_LENGTH 5
```

Maximum length of the transport service typology string.

◆ K_APEX_TRANSPORT_SERVICE_TYPOLOGY_MAX_SIZE

```
#define  
K_APEX_TRANSPORT_SERVICE_TYPOLOGY_MAX_SIZE K_APEX_TRANSPORT_SERVICE_TYP  
+ 1
```

Maximum size for the transport service typology string buffer (NULL terminator included).

◆ K_APEX_VAT_NUMBER_MAX_LENGTH

```
#define K_APEX_VAT_NUMBER_MAX_LENGTH 12
```

Maximum length of the VAT number string.

◆ K_APEX_VAT_NUMBER_MAX_SIZE

```
#define K_APEX_VAT_NUMBER_MAX_SIZE K_APEX_VAT_NUMBER_MAX_LENGTH + 1
```

Maximum size for the VAT number string buffer (NULL terminator included).

◆ K_APEX_ZONE_ID_MAX_LENGTH

```
#define K_APEX_ZONE_ID_MAX_LENGTH 36
```

Maximum length of the zone ID string.

◆ K_APEX_ZONE_ID_MAX_SIZE

```
#define K_APEX_ZONE_ID_MAX_SIZE K_APEX_ZONE_ID_MAX_LENGTH + 1
```

Maximum size for the zone ID string buffer (NULL terminator included).

◆ **K_APEX_ZONE_NAME_MAX_LENGTH**

```
#define K_APEX_ZONE_NAME_MAX_LENGTH 50
```

Maximum length for zone names.

◆ **K_APEX_ZONE_NAME_MAX_SIZE**

```
#define K_APEX_ZONE_NAME_MAX_SIZE K_APEX_ZONE_NAME_MAX_LENGTH + 1
```

Maximum size for zone name buffers (NULL terminator included).

Enumeration Type Documentation

◆ ApexAntipassbackMode

enum **ApexAntipassbackMode**

Behavior to apply during anti-passback checks.

Enumerator

APEX_ANTIPASSBACK_NORMAL	Anti-passback is checked.
APEX_ANTIPASSBACK_SKIP	Anti-passback is skipped.
APEX_ANTIPASSBACK_MAX_VALUE	Maximum enum value.

◆ ApexCallbackStatus

enum **ApexCallbackStatus**

Callback status codes returned by the API-APEX callback functions.

Enumerator

APEX_CALLBACK_STATUS_OK	Correct execution.
APEX_CALLBACK_STATUS_CANCEL	Application request to cancel the operation.
APEX_CALLBACK_STATUS_ERROR	Generic execution error.
APEX_CALLBACK_STATUS_MAX_VALUE	Maximum enum value.

◆ ApexConfigurationMode

enum **ApexConfigurationMode**

Identifies the how the configuration files are loaded by API-APEX.

Enumerator

APEX_CONFIGURATION_MODE_OPERATOR	When loading the configuration files, keep in memory only the configurations that are relevant for the current operator.
----------------------------------	--

Note

This is the default configuration mode used API-APEX. Using this mode will lower the memory used by API-APEX and cause the configuration elements that are not relevant for the current operator to be skipped, improving the configuration loading times.

APEX_CONFIGURATION_MODE_FULL	<p>When loading the configuration files, keep in memory the configurations that are relevant for all the operators present.</p> <p>Note</p> <p>Using this mode will increase the memory used by API-APEX and the configuration loading times, but will allow the current operator to be changed at runtime without having to reinitialize the API-APEX and reload the configurations.</p> <p>See also</p> <p>ApexSetContext</p>
APEX_CONFIGURATION_MODE_MAX_VALUE	Maximum enum value.

◆ ApexConfigureProductMode

enum [ApexConfigureProductMode](#)

Operation mode of the `ApexConfigureProduct` function.

Enumerator	
APEX_CONFIGURE_PRODUCT_MODE_SALE	<p>Apex will configure a product for sale operation. The following <code>ApexLoad()</code> call will be a load operation, and no product will be loaded.</p> <p>Note</p> <p>If this mode is selected <code>ApexConfigureProductPara</code> must have a valid product identifier.</p>
APEX_CONFIGURE_PRODUCT_MODE_LOAD	<p>Apex will configure a product for load operation. The following <code>ApexLoad()</code> call will be a configuration operation.</p> <p>Note</p> <p>If this mode is selected <code>ApexConfigureProductPara</code> must have a valid product identifier.</p>
APEX_CONFIGURE_PRODUCT_MODE_SALE_LOAD	<p>Apex will configure a product for sale and load operation. The following <code>ApexLoad()</code> call will be a configuration operation.</p> <p>Note</p> <p>If this mode is selected <code>ApexConfigureProductPara</code> must have a valid product identifier.</p>
APEX_CONFIGURE_PRODUCT_MODE_TRANSFER_CATALOG	Apex will configure a product to be transferred to a catalog.

	<p>catalog operation.</p> <p>Note When a product is configured transferral, some checks are ignored for the price or units values.</p>
APEX_CONFIGURE_PRODUCT_MODE_TRANSFER_BINARY	<p>Apex will configure a product base on the configuration parameters.</p> <p>This mode removes the need for multiple ApexConfigureProduct calls in order to configure a product. This option works best with the system in pair with ApexTransfer.</p> <p>Note If this mode is selected, the configuration parameters and ApexProductConfigureParameters must have a valid values.</p> <p>When a product is configured transferral, some checks are ignored for the price or units values.</p>
APEX_CONFIGURE_PRODUCT_MODE_MAX_VALUE	Maximum enum value.

◆ ApexConfigureProductStatus

enum [ApexConfigureProductStatus](#)

Status of the ApexConfigureProduct function.

Enumerator	Description
APEX_CONFIGURE_PRODUCT_STATUS_VALID	Product configuration was successful.
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_SALES_PACKAGE_SELECTION	The sales package selection is invalid.
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_PRODUCT_QUANTITY	The product quantity is invalid.
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_START_DATE	The start date is invalid.
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_ZONE_SELECTION	The zone selection is invalid.
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_SPATIAL_VALIDITY_SELECTION	The spatial validity selection is invalid.

APEX_CONFIGURE_PRODUCT_STATUS_CONTRACT_VALIDITY_EXCEEDS_CARD_VALIDITY	Tl lo pi h: Vc C:
APEX_CONFIGURE_PRODUCT_STATUS_CONFIGURED_PRODUCT_ALREADY_EXISTS	Tl oi lo ai cc se re pi pi C:
APEX_CONFIGURE_PRODUCT_STATUS_CONFIGURED_PRODUCT_DOES_NOT_EXIST	Tl oi re oi th cc se n ai pi al in
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_VOUCHER	A v be
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_CARD_SERIAL_NUMBER	A se ha pi
APEX_CONFIGURE_PRODUCT_STATUS_INVALID_CARD_TYPE_ID	Tl ce ne
APEX_CONFIGURE_PRODUCT_STATUS_RELOAD_NOT_YET_AVAILABLE	Tl th tic a'
APEX_CONFIGURE_PRODUCT_STATUS_REQUIRED_PRODUCT_NOT_VALID_TEMPORALLY	Tl pi te fo te Vc C: pi
APEX_CONFIGURE_PRODUCT_STATUS_UNMET_PROFILE_CONDITIONS	Tl ne re

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Vé

APEX_CONFIGURE_PRODUCT_STATUS_MAX_VALUE

◆ ApexContractDurationType

enum [ApexContractDurationType](#)

Contract duration type.

Enumerator

APEX_CONTRACT_DURATION_TYPE_NO_LIMIT	Contract has no duration limit.
APEX_CONTRACT_DURATION_TYPE_LAST_DAY_OF_YEAR	Contract valid until the last day of the current year.
APEX_CONTRACT_DURATION_TYPE_MONTHS	Contract duration in months.
APEX_CONTRACT_DURATION_TYPE_DAYS	Contract duration in days.
APEX_CONTRACT_DURATION_TYPE_HOURS	Contract duration in hours.
APEX_CONTRACT_DURATION_TYPE_HALF_HOURS	Contract duration in half hours.
APEX_CONTRACT_DURATION_TYPE_MINUTES	Contract duration in minutes.
APEX_CONTRACT_DURATION_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexControlContractStatus

enum [ApexControlContractStatus](#)

Control contract status.

Enumerator

APEX_CONTROL_CONTRACT_STATUS_UNKNOWN

APEX_CONTROL_CONTRACT_STATUS_VALID

APEX_CONTROL_CONTRACT_STATUS_INVALID_TEMPORAL_VALIDITY

APEX_CONTROL_CONTRACT_STATUS_INVALID_SPATIAL_VALIDITY

APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_SPATIAL_VALIDITY

APEX_CONTROL_CONTRACT_STATUS_INVALID_IN_OPERATOR

APEX_CONTROL_CONTRACT_STATUS_INVALID_UTILIZATION

APEX_CONTROL_CONTRACT_STATUS_INVALID_VALIDITY_PERIODS

APEX_CONTROL_CONTRACT_STATUS_VALID_BUT_NOT_VALIDATED

APEX_CONTROL_CONTRACT_STATUS_VALID_BUT_NOT_VALIDATED_REQUIRES_DEBIT

APEX_CONTROL_CONTRACT_STATUS_VALID_BUT_NOT_VALIDATED_NOT_ENOUGH_UNITS

APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED

APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED_REQUIRES_DEB

APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED_NOT_ENOUGH_I

APEX_CONTROL_CONTRACT_STATUS_IN_GREYLIST

APEX_CONTROL_CONTRACT_STATUS_IN_SAM_BLACKLIST

APEX_CONTROL_CONTRACT_STATUS_REQUIRED_PROFILE_MISSING

APEX_CONTROL_CONTRACT_STATUS_FORBIDDEN_PROFILE

APEX_CONTROL_CONTRACT_STATUS_INVALID_CARD_UNITS

APEX_CONTROL_CONTRACT_STATUS_INVALID_VALID_DAYS

APEX_CONTROL_CONTRACT_STATUS_INVALID_MUNICIPALITY_CODE

APEX_CONTROL_CONTRACT_STATUS_MAX_VALUE

◆ **ApexControlEnvironmentStatus**

enum **ApexControlEnvironmentStatus**

Control environment status.

Enumerator

APEX_CONTROL_ENVIRONMENT_STATUS_UNKNOWN

Environment data is unknown.

This status results from a missing card or from a card that doesn't belong to the passenger.

Note

This status is only used as input for [ApexGetInfrations\(\)](#).

APEX_CONTROL_ENVIRONMENT_STATUS_VALID

Card environment is valid.

APEX_CONTROL_ENVIRONMENT_STATUS_CARD_EXPIRED

Card is expired.

APEX_CONTROL_ENVIRONMENT_STATUS_CARD_INVALIDATED

Card application is invalidated.

APEX_CONTROL_ENVIRONMENT_STATUS_CARD_CLEAN

Card is clean (not personalized).

APEX_CONTROL_ENVIRONMENT_STATUS_CARD_IN_BLACKLIST

Card is present in the blacklist.

APEX_CONTROL_ENVIRONMENT_STATUS_SAM_IN_BLACKLIST

SAM is present in the blacklist.

APEX_CONTROL_ENVIRONMENT_STATUS_MAX_VALUE

Maximum enum value.

◆ ApexControlStatus

enum [ApexControlStatus](#)

Control status.

Enumerator

APEX_CONTROL_STATUS_UNDETERMINED

Control status is undetermined.

APEX_CONTROL_STATUS_VALID

Card and/or contracts are valid for the current location.

APEX_CONTROL_STATUS_INVALID

Card and/or contracts are not valid for the current location.

APEX_CONTROL_STATUS_MAYBE_VALID

Card and/or contracts are maybe valid for the current location.

APEX_CONTROL_STATUS_MAX_VALUE

Maximum enum value.

◆ ApexControlType

enum [ApexControlType](#)

Identifies the control type.

Enumerator

APEX_CONTROL_TYPE_UNDEFINED	Control type undefined.
APEX_CONTROL_TYPE_CONTRACT	Control based on a card contract.
APEX_CONTROL_TYPE_WHITELIST	Control based on whitelist product.
APEX_CONTROL_TYPE_MAX_VALUE	Enum max value.

◆ ApexControlWhitelistStatus

enum **ApexControlWhitelistStatus**

Control whitelist status.

Enumerator

APEX_CONTROL_WHITELIST_STATUS_UNKNOWN	Card whitelist status is unknown. Should only happen if the whitelist was disabled through the configs or if an error took place.
APEX_CONTROL_WHITELIST_STATUS_VALID	Card is valid through the whitelist (e.g. card or profile combination is present in the whitelist).
APEX_CONTROL_WHITELIST_STATUS_INVALID	Card is invalid through the whitelist.
APEX_CONTROL_WHITELIST_STATUS_MAYBE_VALID	Card is maybe valid through the whitelist. The card (or profile combination) is present in the whitelist, but it is not possible to determine accurately the spatial validity of the

	corresponding product according to the current location.
APEX_CONTROL_WHITELIST_STATUS_VALID_BUT_NOT_VALIDATED	Card is valid through the whitelist but has not been validated.
APEX_CONTROL_WHITELIST_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED	Card is maybe valid through the whitelist but has not been validated.
APEX_CONTROL_WHITELIST_STATUS_MAX_VALUE	Maximum enum value.

◆ ApexCountersTransactionContext

enum **ApexCountersTransactionContext**

Indicates the context of counters transaction.

Enumerator	
APEX_COUNTERS_TRANSACTION_CONTEXT_FIRST TRANSACTION	First transaction. Couters must be 0.
APEX_COUNTERS_TRANSACTION_CONTEXT_MIDDLE_TRANSACTION	Middle transactions. Couters were incremented with the previous transaction localization context.

◆ ApexDetailedStatus

enum **ApexDetailedStatus**

Detailed error codes.

Some status codes are accompanied by a detailed error code that gives further information on the error.

Enumerator	
APEX_DETAILED_STATUS_NO_DETAIL	There current
APEX_DETAILED_STATUS_FILE_PARSER_NOT_INITIALIZED_ERROR	The configuration module
APEX_DETAILED_STATUS_FILE_PARSER_CALLBACK_ERROR	An error occurred while parsing the file.

APEX_DETAILED_STATUS_FILE_OPEN_ERROR	Error \
APEX_DETAILED_STATUS_FILE_READ_ERROR	Error \
APEX_DETAILED_STATUS_EMPTY_FILE_ERROR	File is
APEX_DETAILED_STATUS_TECHNICAL_PARAMETERS_CONFIGURATION_FILE_ERROR	A synt technic file.
APEX_DETAILED_STATUS_NETWORK_CONFIGURATION_FILE_ERROR	A synt netwo
APEX_DETAILED_STATUS_COMMERCIAL_OFFER_CONFIGURATION_FILE_ERROR	A synt comm
APEX_DETAILED_STATUS_ACTION_LISTS_CONFIGURATION_FILE_ERROR	A synt action
APEX_DETAILED_STATUS_INVALID_CARD_READER	The ID found.
APEX_DETAILED_STATUS_INVALID_SAM_READER	The ID found.
APEX_DETAILED_STATUS_INPUT_DATA_CHANGED	The in compa functi
APEX_DETAILED_STATUS_UNMET_PRODUCT_CONDITIONS	The pr require
APEX_DETAILED_STATUS_UNMET_PROFILE_CONDITIONS	The pr profile
APEX_DETAILED_STATUS_DATA_CORRUPTION_DETECTED	A men has be
APEX_DETAILED_STATUS_INVALID_CARD_PRODUCT_CONFIGURATION	A proc config
APEX_DETAILED_STATUS_UNKNOWN_PRODUCT	The pr curren
APEX_DETAILED_STATUS_CARD_EXPIRED	The ca tolerar
APEX_DETAILED_STATUS_CARD_FULL	All the filled.
APEX_DETAILED_STATUS_OUTSIDE_SALE_PERIOD	The cu month
APEX_DETAILED_STATUS_INVALID_TRANSACTION_TYPE	An inv detect
APEX_DETAILED_STATUS_DIFFERENT_CARD_DETECTED	A diffe or the since t
APEX_DETAILED_STATUS_REFUND_NOT_AVAILABLE	Trip re debit t
APEX_DETAILED_STATUS_DIFFERENT_PRODUCT_DETECTED	The pr than e
APEX_DETAILED_STATUS_MISSING_PHYSICAL_SUPPORT_PRODUCT	There produ card ty
APEX_DETAILED_STATUS_TEMPORAL_VALIDITY_OVERFLOW	Apex \ a prod

		validity physic
APEX_DETAILED_STATUS_MAX_VALIDITY_OR_UNITS_REACHED	The re maxim validity	
APEX_DETAILED_STATUS_LOAD_SEQUENCE_CALLBACK_ERROR	An err seque	
APEX_DETAILED_STATUS_NON_ELIGIBLE_PRODUCT	The pr transfe	
APEX_DETAILED_STATUS_DUPLICATE_CONTRACT	A cont more t	
APEX_DETAILED_STATUS_CONTRACT_ALREADY_TRANSFERRED	The co transfe	
APEX_DETAILED_STATUS_INVALID_QUANTITY	The co provid the cu	
APEX_DETAILED_STATUS_UNEXPECTED_PRODUCT_CONFIGURATION	The co are no operat	
APEX_DETAILED_STATUS_MISSING_PAPER_SALE_CACHE	Paper	
APEX_DETAILED_STATUS_DIFFERENT_CARD_DATA_DETECTED	Undo i conter chang	
APEX_DETAILED_STATUS_PRODUCT_ALREADY_USED	Undo i produ alread	
APEX_DETAILED_STATUS_NO_PENDING_INTERRUPTED_TRANSACTION	There transa	
APEX_DETAILED_STATUS_DATA_MODEL_ERROR	The op comple the ca	
APEX_DETAILED_STATUS_INVALID_CARD_TYPE	The ca operat	
APEX_DETAILED_STATUS_ONLINE_CHECK_REJECTED	The op online	
APEX_DETAILED_STATUS_ONLINE_CHECK_FAILED	The or was al	
APEX_DETAILED_STATUS_SAME_CONTRACT_ALREADY_LOADED_TODAY	Card e contra	
APEX_DETAILED_STATUS_CONTRACT_TEMPORAL_VALIDITY_TOO_LONG	Contr too lor	
APEX_DETAILED_STATUS_UNABLE_TO_CONFIGURE_PRODUCT	No val for this card).	
APEX_DETAILED_STATUS_NO_VALID_SALES_PACKAGES	No val found curren	
APEX_DETAILED_STATUS_PROFILE_ERROR	An inc detect	
	Possit	

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APEX_DETAILED_STATUS_MISSING_ACTION_LISTS_CALLBACK	At least one action list is missing.
APEX_DETAILED_STATUS_CHECK_BLACKLIST_CARD_CALLBACK_ERROR	The card is present in the blacklist.
APEX_DETAILED_STATUS_CHECK_BLACKLIST_SAM_CALLBACK_ERROR	The SAM card is present in the blacklist.
APEX_DETAILED_STATUS_CHECK_GREYLIST_CALLBACK_ERROR	The card is present in the greylist.
APEX_DETAILED_STATUS_CHECK_WHITELIST_PROFILE_CALLBACK_ERROR	The card is present in the whitelist profile.
APEX_DETAILED_STATUS_CHECK_WHITELIST_CARD_CALLBACK_ERROR	The card is present in the whitelist.
APEX_DETAILED_STATUS_CHECK_GREENLIST_CALLBACK_ERROR	The card is present in the greenlist.
APEX_DETAILED_STATUS_CARD_READER_COUNT_ERROR	Maximum number of readers reached.
APEX_DETAILED_STATUS_SAM_READER_COUNT_ERROR	Maximum number of SAM readers reached.
APEX_DETAILED_STATUS_CARD_READER_ID_ALREADY_EXISTS_ERROR	A card reader ID already exists.
APEX_DETAILED_STATUS_SAM_READER_ID_ALREADY_EXISTS_ERROR	A SAM reader ID already exists.
APEX_DETAILED_STATUS_NO_VALID_ZONE_SELECTION	No valid zone selection.
APEX_DETAILED_STATUS_NO_VALID_SPATIAL_VALIDITY_SELECTION	No valid spatial validity selection.
APEX_DETAILED_STATUS_CONTRACT_VALIDITY_EXCEEDS_CARD_VALIDITY	Contract validity exceeds card validity.
APEX_DETAILED_STATUS_PRODUCT_ALREADY_EXISTS	The selected product already exists.

		allowe
APEX_DETAILED_STATUS_PRODUCT_TO_RELOAD_MISSING		The se availal not alle
APEX_DETAILED_STATUS_FILE_PARSER_CHECKSUM_ERROR		An err compl
APEX_DETAILED_STATUS_FILE_PARSER_INVALID_SECURITY_HASH		The se invalid
APEX_DETAILED_STATUS_CARD_UNFIT_FOR_USE		The ca curren
		This e not us even t operat Exampl initializ contra is unfit initializ
APEX_DETAILED_STATUS_REQUIRED_PRODUCT_NOT_FOUND		None o a give card.
APEX_DETAILED_STATUS_REQUIRED_PRODUCT_NOT_VALID_TEMPORALLY		None o found valid.
APEX_DETAILED_STATUS_REQUIRED_PRODUCT_DEPENDENCY_FOUND		The pr since i produ
APEX_DETAILED_STATUS_INVALID_LINE		The su unkno
APEX_DETAILED_STATUS_INVALID_PATTERN		The su unkno
APEX_DETAILED_STATUS_INVALID_STOP		The su unkno
APEX_DETAILED_STATUS_MAX_VALUE		Maxim

◆ ApexDocumentType

enum **ApexDocumentType**

Document type.

Enumerator

APEX_DOCUMENT_TYPE_UNDEFINED	Document type is unknown or undefined.
APEX_DOCUMENT_TYPE_CITIZEN_CARD	Document is a citizen card.
APEX_DOCUMENT_TYPE_IDENTITY_CARD	Document is an identity card.
APEX_DOCUMENT_TYPE_FINE_NOTIFICATION	Document is a fine notification.
APEX_DOCUMENT_TYPE_OTHER	Document type is none of the ones defined above.

APEX_DOCUMENT_TYPE_MAX_VALUE

Maximum enum value.

◆ ApexIssueMode

enum [ApexIssueMode](#)

Identifies the data structures that must written/updated during the issue operation.

Enumerator

APEX_ISSUE_MODE_ENVIRONMENT HOLDER_ID	Environment and Holder ID will be written.
APEX_ISSUE_MODE_ENVIRONMENT	Environment will be written.
APEX_ISSUE_MODE_HOLDER_ID	Holder ID will be written.
APEX_ISSUE_MODE_FULL	Environment and Holder ID will be written (card will be clean if contents are present).
APEX_ISSUE_MODE_MAX_VALUE	Maximum enum value.

◆ ApexLowLevelErrorType

enum [ApexLowLevelErrorType](#)

Identifies how the low level error structure should be interpreted.

See also

[ApexLowLevelError](#)

Enumerator

APEX_LOW_LEVEL_ERROR_TYPE_NONE	No low level errors.
APEX_LOW_LEVEL_ERROR_TYPE_CONFIG_FILE_PARSER	There was an error while parsing a configuration file. In this type of low level error ApexLastError.status1 represents the file line in which the error was detected and ApexLastError.status2 represents the ApexDetailedStatus internally returned by the file parser.
	Note The error details may be obtained by calling ApexGetDetailedStatus .
APEX_LOW_LEVEL_ERROR_TYPE_APIVIVA	There was an error during an API VIVA call.

	In this type of low level error ApexLastError.status1 represents T_ApiStatus and ApexLastError.status2 represents T_ApiDetailedError.
	<p>Note The error details may be obtained by calling ApexGetDetailedStatus.</p> <p>See also ApexGetDetailedStatus</p>
APEX_LOW_LEVEL_ERROR_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexMaterializationType

enum [ApexMaterializationType](#)

Materialization type of a product.

Enumerator	
APEX_MATERIALIZATION_TYPE_CONTACTLESS_ONLY	Product used only in contactless cards.
APEX_MATERIALIZATION_TYPE_MOBILE_ONLY	Product used only in mobile devices.
APEX_MATERIALIZATION_TYPE_PRINTED	Printed product.
APEX_MATERIALIZATION_TYPE_CONTACTLESS_MOBILE	Product used in either contactless cards or mobile devices.
APEX_MATERIALIZATION_TYPE_OTHER	Other materialization types.
APEX_MATERIALIZATION_TYPE_VOUCHER	Voucher product.
APEX_MATERIALIZATION_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexOperationType

enum [ApexOperationType](#)

Type of operation that can be performed on a product.

Enumerator	
APEX_OPERATION_TYPE_READ	Consult/Read (default).
APEX_OPERATION_TYPE_SALE	Sale the product.
APEX_OPERATION_TYPE_LOAD	Load an electronic product.
APEX_OPERATION_TYPE_RELOAD	Reload an electronic product.
APEX_OPERATION_TYPE_TRANSFER	Transfer an electronic product.
APEX_OPERATION_TYPE_PERSONALIZATION	Electronic support personalization (e.g. smartcard personalization).

APEX_OPERATION_TYPE_INVALIDATION	Card invalidation.
APEX_OPERATION_TYPE_REHABILITATION	Card rehabilitation.
APEX_OPERATION_TYPE_VALIDATION	Contract validation.
APEX_OPERATION_TYPE_CONTROL	Contract control.
APEX_OPERATION_TYPE_REMOVE	Contract removal.
APEX_OPERATION_TYPE_PRE_SELECTION	Contract pre-selection.
APEX_OPERATION_TYPE_UNDO	Revert the last loading operation.
APEX_OPERATION_TYPE_TRIP_REFUND	Refund of a trip.
APEX_OPERATION_TYPE_CANCEL	Annulment of a product sale/load.
APEX_OPERATION_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexOutOfBoundsType

enum [ApexOutOfBoundsType](#)

Identifies the activation type of out of bounds validation.

Enumerator	
APEX_OUT_OF_BOUNDS_TYPE_WITHIN_BOUNDS	Out of bounds validation is not to be activated.
APEX_OUT_OF_BOUNDS_TYPE_GPS_FAILURE	Force the defined out of bounds stop due to a GPS failure.
APEX_OUT_OF_BOUNDS_TYPE_UNKNOWN_STOP	Force the defined out of bounds stop due to it being an unknown stop to APEX, but a valid stop according to the operation planning.
APEX_OUT_OF_BOUNDS_TYPE_OTHER	Force the defined out of bounds stop due to an unspecified reason.
APEX_OUT_OF_BOUNDS_TYPE_MAX_VALUE	Enum max value.

◆ ApexPaymentMethod

enum [ApexPaymentMethod](#)

Payment method.

Enumerator	
APEX_PAYMENT_METHOD_UNDEFINED	Undefined.
APEX_PAYMENT_METHOD_MULTIPLE_MEANS	Multiple means of payment.
APEX_PAYMENT_METHOD_CASH	Cash.
APEX_PAYMENT_METHOD_CREDIT_CARD	Credit card.
APEX_PAYMENT_METHOD_ACCOUNT_DEBIT	Account debit.
APEX_PAYMENT_METHOD_PMB	PMB.
APEX_PAYMENT_METHOD_MB	MB.
APEX_PAYMENT_METHOD_VOUCHER	Voucher.

APEX_PAYMENT_METHOD_MAX_VALUE

Maximum enum value.

◆ ApexPreSelectionODType

enum [ApexPreSelectionODType](#)

Origin-Destination pre-selection type of a product.

Enumerator

APEX_PRESELECTION_OD_TYPE_NOT_ALLOWED	The OD pre-selection is not allowed for the product.
APEX_PRESELECTION_OD_TYPE_REQUIRED	The OD pre-selection is required to use the product.
APEX_PRESELECTION_OD_TYPE_OPTIONAL	The OD pre-selection is optional.
APEX_PRESELECTION_OD_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexPreSelectionType

enum [ApexPreSelectionType](#)

Contract pre-selection type of a product.

Enumerator

APEX_PRESELECTION_TYPE_OPTIONAL	The pre-selection of the contract is optional.
APEX_PRESELECTION_TYPE_REQUIRED	The pre-selection of the contract is required to use the product.
APEX_PRESELECTION_TYPE_NOT_ALLOWED	The pre-selection of the contract is not allowed for the product.
APEX_PRESELECTION_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexPreValidationStatus

enum [ApexPreValidationStatus](#)

Contract pre-validation status.

Describes the contract status prior to being validated.

Enumerator

APEX_PRE_VALIDATION_STATUS_UNKNOWN	The contract status is unknown (ex: the product described in the contract is unknown).
APEX_PRE_VALIDATION_STATUS_VALID	The contract is potentially valid (prior to validation). The validation or control operations should be used to determine the validity of the contract.

APEX_PRE_VALIDATION_STATUS_EXPIRED	The contract is expired.
APEX_PRE_VALIDATION_STATUS_MAX_VALUE	Max value.

◆ ApexProductParamType

enum [ApexProductParamType](#)

Qualifies the product parameter.

Enumerator	Description
APEX_PRODUCT_PARAM_TYPE_SALES_PACKAGE	Indicates that a sales package selection is being configured. This type of parameter is configured under ApexProductParameter.salesPackageChoice . Only one element may have the ApexProductSalesPackageChoice.isSelected property set to TRUE.
APEX_PRODUCT_PARAM_TYPE_PRODUCT_QUANTITY	Indicates the number of times that the product must be loaded. This type of parameter is configured under ApexProductParameter.numValue .
APEX_PRODUCT_PARAM_TYPE_START_DATE	Indicates that a start date is being configured. This type of parameter is configured under ApexProductParameter.dateTimeValue .
APEX_PRODUCT_PARAM_TYPE_ZONE	Indicates that a zone(s) selection is being configured. This type of parameter is configured under ApexProductParameter.zoneChoice . ApexProductParameter.zoneChoice shows the number of array elements that have the ApexProductZoneChoice.isSelected property set to TRUE.
APEX_PRODUCT_PARAM_TYPE_SPATIAL_VALIDITY	Indicates that a spatial validity selection is being configured. This type of parameter is configured under ApexProductParameter.spatialValidityChoice . Only one element may have the ApexProductSpatialValidityChoice.isSelected property set to TRUE.
APEX_PRODUCT_PARAM_TYPE_VOUCHER	Indicates that voucher must be supplied to finish the product configuration. This type of parameter is configured under ApexProductParameter.textValue .
APEX_PRODUCT_PARAM_TYPE_CARD_SERIAL_NUMBER	Indicates that a card serial number must be supplied to finish the product configuration. This type of parameter is configured under ApexProductParameter.numValue6 .
APEX_PRODUCT_PARAM_TYPE_CARD_TYPE_ID	Indicates that a card type identifier must be supplied to finish the product configuration.

APEX_PRODUCT_PARAM_TYPE_MAX_VALUE	This type of parameter is configured u ApexProductParameter.textValue fi Maximum enum value.
-----------------------------------	--

◆ ApexSessionType

enum [ApexSessionType](#)

Identifies the type of session.

Enumerator	
APEX_SESSION_TYPE_NONE	No session.
APEX_SESSION_TYPE_VALIDATION	Validation session.
APEX_SESSION_TYPE_LOAD	Load session.
APEX_SESSION_TYPE_PERSONALIZATION	Personalization session.
APEX_SESSION_TYPE_MAX_VALUE	Enum max value.

◆ ApexStatus

enum [ApexStatus](#)

Status codes returned by the API-APEX functions.

Enumerator	
APEX_STATUS_NO_ERROR	No error.
APEX_STATUS_CONTEXT_ERROR	Invalid or missing context.
APEX_STATUS_PARAMETER_ERROR	Invalid parameter detected. This error occurs when a parameter has an invalid value or does not have the expected structure or size.
APEX_STATUS_NULL_PARAMETER	Invalid null parameter detected. Check details for parameter name.
APEX_STATUS_INVALID_CALLBACK_ERROR	Invalid or missing callback.
APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR	API-APEX is not initialized. API-APEX must be initialized before calling this method.
See also ApexInit	
APEX_STATUS_MEMORY_ALLOCATION_ERROR	There is not enough memory in the system. This error occurs when API-APEX failed while attempting to allocate memory.

APEX_STATUS_BUFFER_SIZE_ERROR	There is not enough memory allocated in the buffer.
APEX_STATUS_CONFIGURATION_FILE_PARSER_ERROR	A file format error occurred while parsing a configuration file. Check log file for more information.
APEX_STATUS_API_VIVA_ERROR	Generic API VIVA error. Check <code>ApexLastError.ApexLowLevel</code> for more details.
APEX_STATUS_CARD_CLEAN	Card is clean. The operation resulted in errors because it is not allowed on clean cards. Note A clean card is a card that has not yet been sold.
APEX_STATUS_UNSUPPORTED_CARD_OPERATION_ERROR	This operation is not supported by this type of card or data card reader. This error occurs when a card uses a card data model that does not support this type of functionality.
APEX_STATUS_INVALID_CARD_DATA_MODEL	Card has an invalid data model for the operation.
APEX_STATUS_INVALID_CARD_TYPE_ID	The input card type identifier is not recognized by APEX.
APEX_STATUS_CARD_NOT_DETECTED	Card not detected.
APEX_STATUS_INCORRECT_CARD_TYPE_DETECTED	A card with an incorrect card type was detected.
APEX_STATUS_CARD_READER_UNAVAILABLE	No card readers have been configured. This error occurs when no card readers have been configured via <code>ApexAddCardReader</code> . See also ApexAddCardReader
APEX_STATUS_CARD_READER_ERROR	Card reader configuration error. Note Check detailed status for information when this error is obtained. See also ApexAddCardReader
APEX_STATUS_SAM_READER_ERROR	SAM reader configuration error.

	<p>Note Check detailed status for information when this error obtained.</p> <p>See also ApexAddSamReader</p>
APEX_STATUS_CARD_READER_CONNECTION_ERROR	<p>Card reader connection error.</p> <p>Note Check the connection to the card reader and its configuration parameters.</p>
APEX_STATUS_SAM_READER_CONNECTION_ERROR	<p>SAM reader connection error.</p> <p>Note Check the connection to the SAM reader and its configuration parameters.</p>
APEX_STATUS_INVALID_CARD_SAM_ASSOCIATION	<p>The identifier of the card or SAM reader was not found.</p> <p>This error is caused by either:</p> <ul style="list-style-type: none"> • An invalid identifier was passed as input to ApexAddCardSamAssociation. • The card reader was not initialized with the call to ApexAddCardReader. • The SAM reader was not initialized with the call to ApexAddSamReader. <p>Note Check detailed status for information when this error obtained.</p> <p>See also ApexAddCardSamAssociation, ApexAddCardReader, ApexAddSamReader</p>
APEX_STATUS_INCOMPATIBLE_READER_CONFIGURATION	<p>Operation is not compatible with the current card reader configuration.</p> <p>See also ApexAddCardReader</p>
APEX_STATUS_INVALID_PRODUCT_SELECTION	<p>The selected product is not present in the catalog.</p>
APEX_STATUS_INVALID_CONFIGURATION_ID	<p>The input configuration id is not recognized by APEX.</p>

	<p>The configuration id is generated during the product configuration process.</p> <p>See also</p> <ul style="list-style-type: none"> ApexConfigureProduct, ApexConfigurePreSelection
APEX_STATUS_INVALID_PRODUCT_CONFIGURATION	<p>The last configuration is not valid.</p> <p>ApexConfigureProduct() or ApexConfigurePreSelection() must be called until a valid product configuration is selected.</p> <p>See also</p> <ul style="list-style-type: none"> ApexConfigureProduct, ApexConfigurePreSelection
APEX_STATUS_INVALID_CONTRACT_NUMBER	The contract number does not belong to a valid contract.
APEX_STATUS_INVALID_SERVICE_LOCATION	Service location not recognized.
APEX_STATUS_INTERRUPTED_TRANSACTION	The reader lost contact to the card before the transaction was fully completed.
APEX_STATUS_INVALID_SIGNATURE	The transaction does not possess a valid signature.
APEX_STATUS_DATAMODEL_ENCODING_OVERFLOW	Overflow error while converting model structures.
APEX_STATUS_OPERATION_ERROR	<p>The operation was unable to successfully finish.</p> <p>Check error detail for more information regarding this status code.</p>
APEX_STATUS_NO_EXPLORATION_PERIOD	No exploration period is configured for the current operator at the time.
APEX_STATUS_DATA_CONVERSION_ERROR	<p>An error took place during a data conversion attempt.</p> <p>Check log file for more information.</p>
APEX_STATUS_CONFIGURATION_ERROR	<p>A data configuration error has been detected on the loaded configurations.</p> <p>Check log file for more information.</p>
APEX_STATUS_MISSING_CARD_READ	The read card function was not successfully executed before the current function was called.
APEX_STATUS_INVALID_CARD_DATA	The contents present in the card are either incorrect or are unrecognized by the API-APEX.
APEX_STATUS_PRESELECTION_NOT_ALLOWED	OD Pre-selection is not allowed for the selected product.

APEX_STATUS_UNKNOWN_TRANSACTION_ID	The input transaction ID is not recognized by APEX.
	See also ApexControl , ApexCont
APEX_STATUS_LIBRARY_ALREADY_INITIALIZED_ERROR	API-APEX is already initialized.
APEX_STATUS_UNSUPPORTED_PRODUCT_OPERATION_ERROR	This operation is not supported by the product.
APEX_STATUS_CARD_IN_BLACKLIST	The card is present in blacklist.
APEX_STATUS_CARD_INVALIDATED	The card is invalidated.
APEX_STATUS_LOAD_SEQUENCE_FILE_ERROR	An error occurred when accessing the load sequence counter file reading or writing its contents.
APEX_STATUS_UNSUPPORTED_SAM_OPERATION_ERROR	This operation is not supported by the SAM currently in use.
APEX_STATUS_UNSUPPORTED_SAM_CARD_TYPE_ERROR	The card type detected is not supported by the SAM current use.
APEX_STATUS_OPERATION_ABORTED	The current operation was aborted as the result of a callback return code.
APEX_STATUS_CONTRACT_IN_GREYLIST	The contract is present in the greylist.
APEX_STATUS_SAM_IN_BLACKLIST	The contract's or environment's SAM is present in the blacklist.
APEX_STATUS_TRANSACTION_NOT_SIGNED	The transaction does not have a valid MAC signature.
APEX_STATUS_INVALID_TRANSACTION	The transaction format or content are invalid.
APEX_STATUS_OPERATION_ACCESS_DENIED	The operator does not have the necessary permissions to perform this operation.
APEX_STATUS_LOCKED	Apex is already running a function.
APEX_STATUS_INVALID_KEY	The provided key is unknown.
APEX_STATUS_MAX_VALUE	Maximum enum value.

◆ ApexTemporalValidityStartType

enum [ApexTemporalValidityStartType](#)

Identifies the type of initial validity of the product.

Enumerator	Description
APEX_TEMPORAL_VALIDITY_START_TYPE_FIRST_DAY_OF_MONTH	Contract starts at the beginning of the month.
APEX_TEMPORAL_VALIDITY_START_TYPE_FIRST_DAY_OF_YEAR	Contract starts at the beginning of the year.
APEX_TEMPORAL_VALIDITY_START_TYPE_CUSTOMER_DEFINED	Contract starts at a date defined by user.

APEX_TEMPORAL_VALIDITY_START_TYPE_FIRST_VALIDATION	Contract starts when it is validated for the first time.
APEX_TEMPORAL_VALIDITY_START_TYPE_PURCHASE_DATE	Contract starts at the purchase date.
APEX_TEMPORAL_VALIDITY_START_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexTransactionType

enum [ApexTransactionType](#)

Identifies the type of the transaction.

Enumerator	
APEX_TRANSACTION_TYPE_UNKNOWN	Unknown or undefined transaction type.
APEX_TRANSACTION_TYPE_SALE	Product sale.
APEX_TRANSACTION_TYPE_LOAD	Electronic product loading into a card.
APEX_TRANSACTION_TYPE_SALE_LOAD	Transaction composed by a sale and a load operations.
APEX_TRANSACTION_TYPE_ANNUL_SALE	Sale annulment.
APEX_TRANSACTION_TYPE_ANNUL_LOAD	Contract load annulment.
APEX_TRANSACTION_TYPE_ANNUL_SALE_LOAD	Annulment of a sale and load transaction.
APEX_TRANSACTION_TYPE_TRIP_REFUND	Refund of a contract validation.
APEX_TRANSACTION_TYPE_REMOVE_CONTRACT	Removal of a contract.
APEX_TRANSACTION_TYPE_TRANSFER	Contract transfer.
APEX_TRANSACTION_TYPE_ANNUL_TRANSFER	Annulment of a contract transfer.
APEX_TRANSACTION_TYPE_VALIDATION	Validation transaction by contract or profile.
APEX_TRANSACTION_TYPE_PERSONALIZATION	Card personalization.
APEX_TRANSACTION_TYPE_INVALIDATION	Card application invalidation.
APEX_TRANSACTION_TYPE_REHABILITATION	Card application rehabilitation.
APEX_TRANSACTION_TYPE_CONTROL	Control transaction.
APEX_TRANSACTION_TYPE_CONTROL_DECISION	Final decision of a control operation.
APEX_TRANSACTION_TYPE_PRESELECTION	Pre-selection to card.
APEX_TRANSACTION_TYPE_GREENLIST_ERROR	Greenlist error.
APEX_TRANSACTION_TYPE_COUNTERS	Validation, PaperSale and paperSaleAck counters.
APEX_TRANSACTION_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexTripClass

enum [ApexTripClass](#)

Identifies the type of class restriction.

Enumerator

APEX_TRIP_CLASS_UNDEFINED	No restrictions applied.
APEX_TRIP_CLASS_FIRST_CLASS	Restricted to 1st class.
APEX_TRIP_CLASS_SECOND_CLASS	Restricted to 2nd class.
APEX_TRIP_CLASS_MAX_VALUE	Maximum enum value.

◆ ApexTripDurationType

enum [ApexTripDurationType](#)

Trip duration type.

Enumerator

APEX_TRIP_DURATION_TYPE_END_OF_EXPLORATION	The trip is valid until the end of the operator's exploration period.
APEX_TRIP_DURATION_TYPE_CURRENT_TRIP	The trip is valid until the end.
APEX_TRIP_DURATION_TYPE_MONTHS	Trip duration in months.
APEX_TRIP_DURATION_TYPE_DAYS	Trip duration in days.
APEX_TRIP_DURATION_TYPE_HOURS	Trip duration in hours.
APEX_TRIP_DURATION_TYPE_HALF_HOURS	Trip duration in half hours.
APEX_TRIP_DURATION_TYPE_MINUTES	Trip duration in minutes.
APEX_TRIP_DURATION_TYPE_END_OF_DAY	The trip is valid until 23:59:59 of the current day.
APEX_TRIP_DURATION_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexUnitType

enum [ApexUnitType](#)

Counter unit type.

Enumerator

APEX_UNIT_TYPE_NONE	No counter used.
APEX_UNIT_TYPE_TRIPS	Contract units represent the number of trips.
APEX_UNIT_TYPE_STORED_VALUE	Contract units represent the total accumulated value.
APEX_UNIT_TYPE_MAX_VALUE	Maximum enum value.

◆ ApexUtilizationMode

enum [ApexUtilizationMode](#)

Identifies the utilization mode of the product.

Enumerator

APEX_UTILIZATION_MODE_TRANSPORT_ENTRANCE	Transport entrance.
APEX_UTILIZATION_MODE_TRANSPORT_EXIT	Transport exit.
APEX_UTILIZATION_MODE_PARKING	RFU.
APEX_UTILIZATION_MODE_PARKING_METER	RFU.
APEX_UTILIZATION_MODE_SPECIAL_CHANNEL	Special channel.
APEX_UTILIZATION_MODE_MAX_VALUE	Maximum enum value.

◆ ApexValidationStatus

enum **ApexValidationStatus**

Validation detail code. This code indicates the specific validation operation being made within the current configured validation type.

Enumerator	Description
APEX_VALIDATION_STATUS_CONTRACT_VALID	Indicates that the validation was executed successfully through the card contract. The validation may be accepted.
APEX_VALIDATION_STATUS_ANTIPASSBACK	Indicates the validation has been blocked, because an antipassback event was detected. The validation must be rejected.
APEX_VALIDATION_STATUS_CARD_IN_BLACKLIST	Indicates that the validation has been blocked, because the card is listed in the blacklist. The validation must be rejected.
APEX_VALIDATION_STATUS_SAM_IN_BLACKLIST	Indicates that the validation has been blocked, because the SAM is listed in the blacklist. The validation must be rejected.
APEX_VALIDATION_STATUS_CARD_IN_WHITELIST	Indicates that the validation was executed successfully through the card whitelist. The validation may be accepted.
APEX_VALIDATION_STATUS_PROFILE_IN_WHITELIST	Indicates that the validation was executed successfully through the profile whitelist. The validation may be accepted.
APEX_VALIDATION_STATUS_INTERCHANGE	Indicates that the validation was successfully performed using an interchange. No additional counter units were used in this validation and the validation may be accepted.
APEX_VALIDATION_STATUS_INTERRUPTED	Indicates that the validation performed was interrupted. This validation result must be discarded and a new validation must be performed.
APEX_VALIDATION_STATUS_NO_VALID_CONTRACT	Indicates that the validation has not been done, because there is no valid

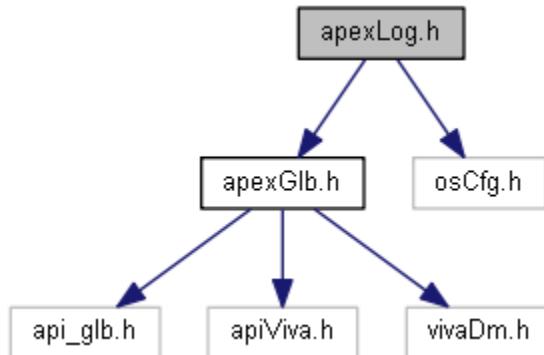
	contract on the card. The validation must be rejected.
APEX_VALIDATION_STATUS_CARD_IS_INVALIDATED	Indicates that the validation has been blocked, because the card is invalidated. The validation must be rejected.
APEX_VALIDATION_STATUS_EVENT_IS_FULL	Indicates that although the card has the contracts for a successful validation, it was not possible to register it in the event. The validation must be rejected.
	<p>Note</p> <p>This status only applies to the data model K_CARD_DATAMODEL_VIVA_V_1.</p>
APEX_VALIDATION_STATUS_NOT_ENOUGH_UNITS	Indicates that the validation has not been done, because the only contract found does not have enough units. The validation must be rejected.
APEX_VALIDATION_STATUS_CONTRACT_EXPIRED	Indicates that the validation has not been done, because the only contract found is expired. The validation must be rejected.
APEX_VALIDATION_STATUS_MAX_VALUE	Maximum enum value.



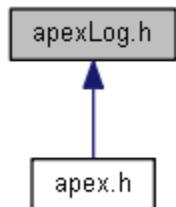
apexLog.h File Reference

```
#include "apexGlb.h" #include "osCfg.h"
```

Include dependency graph for apexLog.h:



This graph shows which files directly or indirectly include this file:



Go to the source code of this file.

Data Structures

struct **ApexLogConfig**

Data structure used to configure the logger. More...

Macros

```
#define K_APEX_LOG_FILENAME_DEFAULT "api_apex.log"
Default log filename. More...
```

TypeDefs

```
typedef void(CALLBACK * F_CB_ExternalLogger)(ApexLogMessageType inMessageType, T_S8 *inMessage)  
Logger callback used for an external logger. More...
```

Enumerations

```
enum ApexLogLevel {  
    APEX_LOG_LEVEL_NONE = 0,  
    APEX_LOG_LEVEL_ERROR = 1,  
    APEX_LOG_LEVEL_WARNING = 2,  
    APEX_LOG_LEVEL_INFO = 3,  
    APEX_LOG_LEVEL_DEBUG = 4  
}
```

```
enum ApexLogMessageType {  
    APEX_LOG_MESSAGE_TYPE_ERROR = 1,  
    APEX_LOG_MESSAGE_TYPE_WARNING = 2,  
    APEX_LOG_MESSAGE_TYPE_INFO = 3,  
    APEX_LOG_MESSAGE_TYPE_DEBUG = 4 }
```

```
enum ApexLogType { APEX_LOG_TYPE_INTERNAL_FILE = 0,  
    APEX_LOG_TYPE_EXTERNAL_CALLBACK = 1 }
```

Macro Definition Documentation

◆ K_APEX_LOG_FILENAME_DEFAULT

```
#define K_APEX_LOG_FILENAME_DEFAULT "api_apex.log"
```

Default log filename.

Summary External definitions of Logger features used by the API-APEX.

Remarks **Preliminary Note:**

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Contents:

This document, a header file format (C language), contains the Logger definitions used by the API-APEX.

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João Rosa

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Typedef Documentation

◆ F_CB_ExternalLogger

```
typedef void(CALLBACK* F_CB_ExternalLogger)  
(ApexLogMessageType inMessageType, T_S8 *inMessage)
```

Logger callback used for an external logger.

This callback is used in a logger of type APEX_LOG_TYPE_EXTERNAL_CALLBACK to forward logger messages.

See also

[ApexLogType](#)

Enumeration Type Documentation

◆ ApexLogLevel

enum ApexLogLevel

The following enumeration states the possible levels in which the logger can be configured to work.

Enumerator

APEX_LOG_LEVEL_NONE	Output no tracing nor debugging messages.
APEX_LOG_LEVEL_ERROR	Output error-handling messages.
APEX_LOG_LEVEL_WARNING	Output warnings and error-handling messages.
APEX_LOG_LEVEL_INFO	Output information messages, warnings, and error-handling messages.
APEX_LOG_LEVEL_DEBUG	Output all debugging and tracing messages.

◆ ApexLogMessageType

enum ApexLogMessageType

Defines the type of a logging message.

Enumerator	
APEX_LOG_MESSAGE_TYPE_ERROR	Error message.
APEX_LOG_MESSAGE_TYPE_WARNING	Warning message.
APEX_LOG_MESSAGE_TYPE_INFO	Info message.
APEX_LOG_MESSAGE_TYPE_DEBUG	Debug message.

◆ ApexLogType

enum **ApexLogType**

Defines the working mode of the logger.

Enumerator	
APEX_LOG_TYPE_INTERNAL_FILE	<p>Internal logger using a file in the file system.</p> <p>In this mode the logger will handle all the messages and write them to a specified or default file.</p>
APEX_LOG_TYPE_EXTERNAL_CALLBACK	<p>External logger using a callback.</p> <p>In this mode the logger will forward all messages to the callback and it is the callback's</p>

responsibility to
register them.

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Here is a list of all functions, variables, defines, enums, and typedefs with links to the files they belong to:

- a -

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- APEX_ANTIPASSBACK_NORMAL : [apexGlb.h](#)
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- APEX_CALLBACK_ID_CHECK_BLACKLIST_SAM : [apex.h](#)
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Here is a list of all functions, variables, defines, enums, and typedefs with links to the files they belong to:

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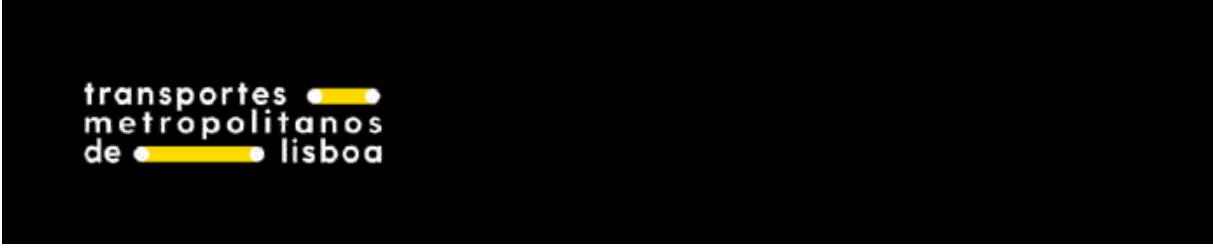
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- K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE : [apexGlb.h](#)
- K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_PATTERN_ID_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_PATTERN_NAME_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PATTERN_NAME_MAX_SIZE : [apexGlb.h](#)
- K_APEX_PERSONALIZATION_ID_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PERSONALIZATION_ID_MAX_SIZE : [apexGlb.h](#)
- K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE : [apexGlb.h](#)
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- K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE : [apexGlb.h](#)
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- K_APEX_READER_ADDRESS_MAX_LENGTH : apexGlb.h
- K_APEX_READER_ADDRESS_MAX_SIZE : apexGlb.h
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- K_APEX_SALES_PACKAGE_ID_MAX_SIZE : apexGlb.h
- K_APEX_SAM_TYPE_ID_MAX_LENGTH : apexGlb.h
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- K_APEX_TRANSACTION_ID_MAX_LENGTH : apexGlb.h
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- K_APEX_ZONE_NAME_MAX_SIZE : apexGlb.h

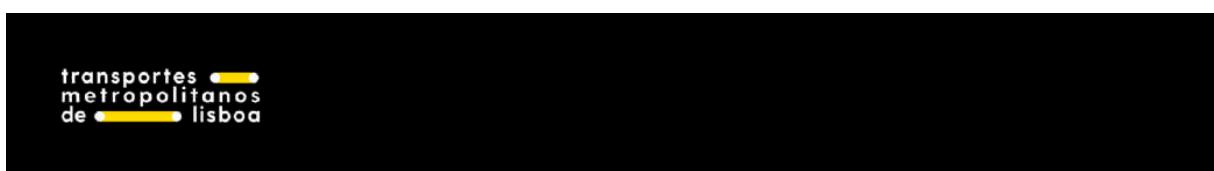


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- ApexAddSamReader() : **apex.h**
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- K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE : [apexGlb.h](#)
- K_APEX_INFRACTION_DESCRIPTION_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE : [apexGlb.h](#)
- K_APEX_INFRACTION_ID_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_INFRACTION_NUMBER_MAX_LENGTH : [apexGlb.h](#)

- K_APEX_INFRACTION_NUMBER_MAX_SIZE : [apexGlb.h](#)
- K_APEX_INFRACTION_PLACE_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_INFRACTION_PROCEDURE_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_INVOICE_NUMBER_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_ISSUER_DATA_MAX_SIZE : [apexGlb.h](#)
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- K_APEX_LIBRARY_VERSION_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_LINE_ID_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_LINE_ID_MAX_SIZE : [apexGlb.h](#)
- K_APEX_LINE_NAME_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_LINE_NAME_MAX_SIZE : [apexGlb.h](#)
- K_APEX_LOG_FILENAME_DEFAULT : [apexLog.h](#)
- K_APEX_LOYALTY_RECORDS_MAX_SIZE : [apexGlb.h](#)
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- K_APEX_MAX_CARD_READERS : [apex.h](#)
- K_APEX_MAX_SAM_READERS : [apex.h](#)
- K_APEX_NETWORK_ID_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_NETWORK_ID_MAX_SIZE : [apexGlb.h](#)
- K_APEX_OFFENDER_ADDRESS_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_OFFENDER_ADDRESS_MAX_SIZE : [apexGlb.h](#)
- K_APEX_OFFENDER_NAME_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_OFFENDER_NAME_MAX_SIZE : [apexGlb.h](#)
- K_APEX_OFFENDER_POSTAL_CODE_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_OFFENDER_POSTAL_CODE_MAX_SIZE : [apexGlb.h](#)
- K_APEX_OPERATION_PLAN_ID_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_OPERATION_PLAN_ID_MAX_SIZE : [apexGlb.h](#)
- K_APEX_OPERATOR_ID_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_OPERATOR_ID_MAX_SIZE : [apexGlb.h](#)
- K_APEX_OPERATOR_NAME_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_OPERATOR_NAME_MAX_SIZE : [apexGlb.h](#)

- K_APEX_OPERATOR_SHORT_NAME_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE : [apexGlb.h](#)
- K_APEX_PAPER_TICKET_NUMBER_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE : [apexGlb.h](#)
- K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_PATTERN_ID_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PATTERN_ID_MAX_SIZE : [apexGlb.h](#)
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- K_APEX_PERSONALIZATION_ID_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PERSONALIZATION_ID_MAX_SIZE : [apexGlb.h](#)
- K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE : [apexGlb.h](#)
- K_APEX_PRODUCT_ID_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE : [apexGlb.h](#)
- K_APEX_PRODUCT_NAME_MAX_LENGTH : [apexGlb.h](#)
- K_APEX_PRODUCT_NAME_MAX_SIZE : [apexGlb.h](#)
- K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_LENGTH : [apexGlb.h](#)
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- K_APEX_SALES_PACKAGE_ID_MAX_LENGTH : apexGlb.h
- K_APEX_SALES_PACKAGE_ID_MAX_SIZE : apexGlb.h
- K_APEX_SAM_TYPE_ID_MAX_LENGTH : apexGlb.h
- K_APEX_SAM_TYPE_ID_MAX_SIZE : apexGlb.h
- K_APEX_SELECT_APP_INFO_MAX_SIZE : apexGlb.h
- K_APEX_SPATIAL_VALIDITY_ID_MAX_LENGTH : apexGlb.h
- K_APEX_SPATIAL_VALIDITY_ID_MAX_SIZE : apexGlb.h
- K_APEX_SPATIAL_VALIDITY_MAX_SIZE : apexGlb.h
- K_APEX_STOP_ID_MAX_LENGTH : apexGlb.h
- K_APEX_STOP_ID_MAX_SIZE : apexGlb.h
- K_APEX_STOP_NAME_MAX_LENGTH : apexGlb.h
- K_APEX_STOP_NAME_MAX_SIZE : apexGlb.h
- K_APEX_TAX_ID_MAX_LENGTH : apexGlb.h
- K_APEX_TAX_ID_MAX_SIZE : apexGlb.h
- K_APEX_TRANSACTION_ID_MAX_LENGTH : apexGlb.h
- K_APEX_TRANSACTION_ID_MAX_SIZE : apexGlb.h
- K_APEX_TRANSPORT_SERVICE TYPOLOGY_MAX_LENGTH : apexGlb.h
- K_APEX_TRANSPORT_SERVICE TYPOLOGY_MAX_SIZE : apexGlb.h
- K_APEX_VAT_NUMBER_MAX_LENGTH : apexGlb.h
- K_APEX_VAT_NUMBER_MAX_SIZE : apexGlb.h
- K_APEX_ZONE_ID_MAX_LENGTH : apexGlb.h
- K_APEX_ZONE_ID_MAX_SIZE : apexGlb.h
- K_APEX_ZONE_NAME_MAX_LENGTH : apexGlb.h
- K_APEX_ZONE_NAME_MAX_SIZE : apexGlb.h

apexGlb.h

Go to the documentation of this file.

```
1
29 #ifndef __APEX_GLB_H
30 #define __APEX_GLB_H
31
32
33 /* -----
34 * - Includes -----
35 * -----
36 */
37 // API VIVA header files
38 #include "api_glb.h"
39 #include "apiViva.h"
40 #include "vivaDm.h"
41
42 #ifdef __cplusplus
43 extern "C" {
44 #endif /* __cplusplus */
45
46
47 /* -----
48 * - Defines -----
49 * -----
50 */
52 #define K_APEX_FILE_PATH_MAX_LENGTH
53     K_OS_FILE_PATH_MAX_SIZE - 1
55 #define K_APEX_FILE_PATH_MAX_SIZE
56     K_OS_FILE_PATH_MAX_SIZE
57 #define K_APEX_LIBRARY_VERSION_MAX_LENGTH
58     11
59 #define K_APEX_LIBRARY_VERSION_MAX_SIZE
60     K_APEX_LIBRARY_VERSION_MAX_LENGTH + 1
62 #define K_APEX_FILE_VERSION_MAX_LENGTH
7
```

```
63 | #define K_APEX_FILE_VERSION_MAX_SIZE  
64 |     K_APEX_FILE_VERSION_MAX_LENGTH + 1  
65 |  
67 | #define K_APEX_CARD_PIN_CODE_MAX_SIZE  
68 |     4  
69 |  
70 | #define K_APEX_PROFILES_MAX_SIZE  
71 |     K_VIVA_HOLDER_PROFILE_ENTRY_MAX_LENGTH  
72 |  
73 | #define K_APEX_ISSUER_DATA_MAX_SIZE  
74 |     K_VIVA_ISSUER_DATA_MAX_LENGTH  
75 |  
76 | #define K_APEX_SPATIAL_VALIDITY_MAX_SIZE  
77 |     K_VIVA_SPATIAL_VALIDITY_MAX_RECORDS  
78 |  
79 | #define K_APEX_MAX_AVAILABLE_ZONES_COUNT  
80 |     135  
81 |  
82 | #define K_APEX_LOYALTY_RECORDS_MAX_SIZE  
83 |     8  
84 |  
85 | #define K_APEX HOLDER_NAME_MAX_LENGTH  
86 |     K_VIVA_HOLDER_ID_NAME_MAX_LENGTH - 1  
87 |  
88 | #define K_APEX HOLDER_NAME_MAX_SIZE  
89 |     K_VIVA_HOLDER_ID_NAME_MAX_LENGTH  
90 |  
91 | #define K_APEX_CONTRACTS_MAX_SIZE  
92 |     K_MAX_CONTRACT_GEN2  
93 |  
94 | #define K_APEX_CARD_TYPE_ID_MAX_LENGTH  
95 |     36  
96 |  
97 | #define K_APEX_CARD_TYPE_ID_MAX_SIZE  
98 |     K_APEX_CARD_TYPE_ID_MAX_LENGTH + 1  
99 |  
100| #define K_APEX_SAM_TYPE_ID_MAX_LENGTH  
101|     36  
102|  
103| #define K_APEX_SAM_TYPE_ID_MAX_SIZE  
104|     K_APEX_SAM_TYPE_ID_MAX_LENGTH + 1  
105|  
106| #define K_APEX_OPERATOR_ID_MAX_SIZE  
107|     K_APEX_OPERATOR_ID_MAX_LENGTH + 1  
108|  
109| #define K_APEX_NETWORK_ID_MAX_LENGTH  
110|     36  
111|  
112| #define K_APEX_NETWORK_ID_MAX_SIZE  
113|     K_APEX_NETWORK_ID_MAX_LENGTH + 1
```

```
112
114 #define K_APEX_DEVICE_ID_MAX_LENGTH
40
115
116 #define K_APEX_DEVICE_ID_MAX_SIZE
K_APEX_DEVICE_ID_MAX_LENGTH + 1
117
119 #define K_APEX_CHANNEL_ID_MAX_LENGTH
36
120
121 #define K_APEX_CHANNEL_ID_MAX_SIZE
K_APEX_CHANNEL_ID_MAX_LENGTH + 1
122
124 #define K_APEX_PROFILE_ID_MAX_LENGTH
36
125
126 #define K_APEX_PROFILE_ID_MAX_SIZE
K_APEX_PROFILE_ID_MAX_LENGTH + 1
127
129 #define K_APEX_PRODUCT_ID_MAX_LENGTH
36
130
131 #define K_APEX_PRODUCT_ID_MAX_SIZE
K_APEX_PRODUCT_ID_MAX_LENGTH + 1
132
134 #define K_APEX_GENERIC_ID_MAX_LENGTH
36
135
136 #define K_APEX_GENERIC_ID_MAX_SIZE
K_APEX_GENERIC_ID_MAX_LENGTH + 1
137
139 #define K_APEX_SALES_PACKAGE_ID_MAX_LENGTH
36
140
141 #define K_APEX_SALES_PACKAGE_ID_MAX_SIZE
K_APEX_SALES_PACKAGE_ID_MAX_LENGTH + 1
142
144 #define K_APEX_TAX_ID_MAX_LENGTH
36
145
146 #define K_APEX_TAX_ID_MAX_SIZE
K_APEX_TAX_ID_MAX_LENGTH + 1
147
149 #define K_APEX_READER_ADDRESS_MAX_LENGTH
K_COMM_DEV_NAME_MAX_LENGTH - 1
150
151 #define K_APEX_READER_ADDRESS_MAX_SIZE
K_APEX_READER_ADDRESS_MAX_LENGTH + 1
152
154 #define K_APEX_OPERATION_PLAN_ID_MAX_LENGTH
36
155
156 #define K_APEX_OPERATION_PLAN_ID_MAX_SIZE
K_APEX_OPERATION_PLAN_ID_MAX_LENGTH + 1
```

```
157  
159 #define K_APEX_BLOCK_ID_MAX_LENGTH  
36  
160  
161 #define K_APEX_BLOCK_ID_MAX_SIZE  
K_APEX_BLOCK_ID_MAX_LENGTH + 1  
162  
164 #define K_APEX_DUTY_ID_MAX_LENGTH  
36  
165  
166 #define K_APEX_DUTY_ID_MAX_SIZE  
K_APEX_DUTY_ID_MAX_LENGTH + 1  
167  
169 #define K_APEX_JOURNEY_ID_MAX_LENGTH  
36  
170  
171 #define K_APEX_JOURNEY_ID_MAX_SIZE  
K_APEX_JOURNEY_ID_MAX_LENGTH + 1  
172  
174 #define K_APEX_EXTRA_JOURNEY_ID_MAX_LENGTH  
36  
175  
176 #define K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE  
K_APEX_EXTRA_JOURNEY_ID_MAX_LENGTH + 1  
177  
179 #define K_APEX_ZONE_ID_MAX_LENGTH  
36  
180  
181 #define K_APEX_ZONE_ID_MAX_SIZE  
K_APEX_ZONE_ID_MAX_LENGTH + 1  
182  
184 #define K_APEX_ZONE_NAME_MAX_LENGTH  
50  
185  
186 #define K_APEX_ZONE_NAME_MAX_SIZE  
K_APEX_ZONE_NAME_MAX_LENGTH + 1  
187  
189 #define K_APEX_LINE_ID_MAX_LENGTH  
36  
190  
191 #define K_APEX_LINE_ID_MAX_SIZE  
K_APEX_LINE_ID_MAX_LENGTH + 1  
192  
193 // @brief Maximum length for line names.  
194 #define K_APEX_LINE_NAME_MAX_LENGTH  
50  
195 // @brief Maximum size for line name buffers (NULL terminator  
     included).  
196 #define K_APEX_LINE_NAME_MAX_SIZE  
K_APEX_LINE_NAME_MAX_LENGTH + 1  
197  
199 #define K_APEX_PATTERN_ID_MAX_LENGTH  
36  
200
```

```
201 #define K_APEX_PATTERN_ID_MAX_SIZE  
    K_APEX_PATTERN_ID_MAX_LENGTH + 1  
202  
203 // @brief Maximum length for pattern names.  
204 #define K_APEX_PATTERN_NAME_MAX_LENGTH  
    50  
205 // @brief Maximum size for pattern name buffers (NULL terminator  
    included).  
206 #define K_APEX_PATTERN_NAME_MAX_SIZE  
    K_APEX_PATTERN_NAME_MAX_LENGTH + 1  
207  
209 #define K_APEX_STOP_ID_MAX_LENGTH  
    36  
210  
211 #define K_APEX_STOP_ID_MAX_SIZE  
    K_APEX_STOP_ID_MAX_LENGTH + 1  
212  
214 #define K_APEX_STOP_NAME_MAX_LENGTH  
    50  
215  
216 #define K_APEX_STOP_NAME_MAX_SIZE  
    K_APEX_STOP_NAME_MAX_LENGTH + 1  
217  
219 #define K_APEX_CSV_MAX_LENGTH  
    2048  
220  
222 #define K_APEX_CSV_MAX_SIZE  
    K_APEX_CSV_MAX_LENGTH + 1  
223  
225 #define K_APEX_PRODUCT_NAME_MAX_LENGTH  
    50  
226  
227 #define K_APEX_PRODUCT_NAME_MAX_SIZE  
    K_APEX_PRODUCT_NAME_MAX_LENGTH + 1  
228  
230 #define K_APEX_TRANSACTION_ID_MAX_LENGTH  
    36  
231  
232 #define K_APEX_TRANSACTION_ID_MAX_SIZE  
    K_APEX_TRANSACTION_ID_MAX_LENGTH + 1  
233  
235 #define K_APEX_OPERATOR_SHORT_NAME_MAX_LENGTH  
    10  
236  
237 #define K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE  
    K_APEX_OPERATOR_SHORT_NAME_MAX_LENGTH + 1  
238  
240 #define K_APEX_OPERATOR_NAME_MAX_LENGTH  
    50  
241  
242 #define K_APEX_OPERATOR_NAME_MAX_SIZE  
    K_APEX_OPERATOR_NAME_MAX_LENGTH + 1  
243
```

```
245 #define K_APEX_PROFILE_NAME_MAX_LENGTH  
50  
246  
247 #define K_APEX_PROFILE_NAME_MAX_SIZE  
K_APEX_PROFILE_NAME_MAX_LENGTH + 1  
248  
250 #define K_APEX_SELECT_APP_INFO_MAX_SIZE  
K_INFO_MAX_LENGTH  
251  
253 #define K_APEX_INFRACTION_ID_MAX_LENGTH  
36  
254  
255 #define K_APEX_INFRACTION_ID_MAX_SIZE  
K_APEX_INFRACTION_ID_MAX_LENGTH + 1  
256  
258 #define K_APEX_INFRACTION_DESCRIPTION_MAX_LENGTH  
255  
259  
260 #define K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE  
K_APEX_INFRACTION_DESCRIPTION_MAX_LENGTH + 1  
261  
263 #define K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_LENGTH  
36  
264  
265 #define K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE  
K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_LENGTH + 1  
266  
268 #define K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_LENGTH  
255  
269  
270 #define K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_SIZE  
K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_LENGTH + 1  
271  
273 #define K_APEX_INFRACTION_PROCEDURE_MAX_LENGTH  
255  
274  
275 #define K_APEX_INFRACTION_PROCEDURE_MAX_SIZE  
K_APEX_INFRACTION_PROCEDURE_MAX_LENGTH + 1  
276  
278 #define K_APEX_FINE_ID_MAX_LENGTH  
36  
279  
280 #define K_APEX_FINE_ID_MAX_SIZE  
K_APEX_FINE_ID_MAX_LENGTH + 1  
281  
283 #define K_APEX_FINE_DESCRIPTION_MAX_LENGTH  
255  
284  
285 #define K_APEX_FINE_DESCRIPTION_MAX_SIZE  
K_APEX_FINE_DESCRIPTION_MAX_LENGTH + 1  
286  
288 #define K_APEX_FINE_ATTRIBUTE_ID_MAX_LENGTH  
36  
289
```

```

290 #define K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE
      K_APEX_FINE_ATTRIBUTE_ID_MAX_LENGTH + 1
291
293 #define K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_LENGTH
      255
294
295 #define K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_SIZE
      K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_LENGTH + 1
296
298 #define K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_LENGTH
      50
299
300 #define K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE
      K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_LENGTH + 1
301
303 #define K_APEX_CONFIGURATION_ID_MAX_LENGTH
      36
304
305 #define K_APEX_CONFIGURATION_ID_MAX_SIZE
      K_APEX_CONFIGURATION_ID_MAX_LENGTH + 1
306
308 #define K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_LENGTH
      36
309
310 #define K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_SIZE
      K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_LENGTH + 1
311
313 #define K_APEX_PAPER_TICKET_NUMBER_MAX_LENGTH
      20
314
315 #define K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE
      K_APEX_PAPER_TICKET_NUMBER_MAX_LENGTH + 1
316
318 #define K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_LENGTH
      136
319
320 #define K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE
      K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_LENGTH + 1
321
323 #define K_APEX_BINARY_MAX_SIZE
      K_VIVA_CONTRACT_AUX_COUNTER_BINARY_MAX_SIZE
324
325 // Maximum length for action lists item identifiers.
326 #define K_APEX_ACTION_LISTS_ITEM_ID_MAX_LENGTH
      36
327 // Maximum size for action lists item identifier buffers (NULL
      terminator included).
328 #define K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE
      K_APEX_ACTION_LISTS_ITEM_ID_MAX_LENGTH + 1
329
330 // Maximum length for personalization identifiers.
331 #define K_APEX_PERSONALIZATION_ID_MAX_LENGTH
      36

```

```

332 // Maximum size for personalization identifier buffers (NULL
      terminator included).
333 #define K_APEX_PERSONALIZATION_ID_MAX_SIZE
      K_APEX_PERSONALIZATION_ID_MAX_LENGTH + 1
334
335 // Maximum length for greenlist authorization identifiers.
336 #define K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_LENGTH
      36
337 // Maximum size for greenlist authorization identifier buffers (NULL
      terminator included).
338 #define K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_SIZE
      K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_LENGTH + 1
339
340 // Maximum length for spatial validity identifiers.
341 #define K_APEX_SPATIAL_VALIDITY_ID_MAX_LENGTH
      36
342 // Maximum size for spatial validity identifier buffers (NULL
      terminator included).
343 #define K_APEX_SPATIAL_VALIDITY_ID_MAX_SIZE
      K_APEX_SPATIAL_VALIDITY_ID_MAX_LENGTH + 1
344
345 // Maximum length for product matrix element identifiers.
346 #define K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_LENGTH
      36
347 // Maximum size for product matrix element identifier buffers (NULL
      terminator included).
348 #define K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE
      K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_LENGTH + 1
349
350 #define K_APEX_ACCESS_KEY_MAX_LENGTH
      256
351
352 #define K_APEX_ACCESS_KEY_MAX_SIZE
      K_APEX_ACCESS_KEY_MAX_LENGTH + 1
353
354 /* -----
   ----- */
355 * - Control Defines -----
   ----- *
356 * -----
   ----- */
357
358
360 #define K_APEX_INFRACTION_NUMBER_MAX_LENGTH
361
362 #define K_APEX_INFRACTION_NUMBER_MAX_SIZE
      K_APEX_INFRACTION_NUMBER_MAX_LENGTH + 1
363
365 #define K_APEX_TRANSPORT_SERVICE_TYPOLOGY_MAX_LENGTH
366
367 #define K_APEX_TRANSPORT_SERVICE_TYPOLOGY_MAX_SIZE
      K_APEX_TRANSPORT_SERVICE_TYPOLOGY_MAX_LENGTH + 1
368
370 #define K_APEX_OFFENDER_NAME_MAX_LENGTH
371

```

20

5

128

```

372 #define K_APEX_OFFENDER_NAME_MAX_SIZE
      K_APEX_OFFENDER_NAME_MAX_LENGTH + 1
373
375 #define K_APEX_OFFENDER_ADDRESS_MAX_LENGTH 128
376
377 #define K_APEX_OFFENDER_ADDRESS_MAX_SIZE
      K_APEX_OFFENDER_ADDRESS_MAX_LENGTH + 1
378
380 #define K_APEX_OFFENDER_POSTAL_CODE_MAX_LENGTH 8
381
382 #define K_APEX_OFFENDER_POSTAL_CODE_MAX_SIZE
      K_APEX_OFFENDER_POSTAL_CODE_MAX_LENGTH + 1
383
385 #define K_APEX_IDENTITY_NUMBER_MAX_LENGTH 32
386
387 #define K_APEX_IDENTITY_NUMBER_MAX_SIZE
      K_APEX_IDENTITY_NUMBER_MAX_LENGTH + 1
388
390 #define K_APEX_VAT_NUMBER_MAX_LENGTH 12
391
392 #define K_APEX_VAT_NUMBER_MAX_SIZE
      K_APEX_VAT_NUMBER_MAX_LENGTH + 1
393
395 #define K_APEX_INVOICE_NUMBER_MAX_LENGTH 30
396
397 #define K_APEX_INVOICE_NUMBER_MAX_SIZE
      K_APEX_INVOICE_NUMBER_MAX_LENGTH + 1
398
400 #define K_APEX_DOCUMENT_OBS_MAX_LENGTH 102
401
402 #define K_APEX_DOCUMENT_OBS_MAX_SIZE
      K_APEX_DOCUMENT_OBS_MAX_LENGTH + 1
403
405 #define K_APEX_INFRACTION_PLACE_MAX_LENGTH 64
406
407 #define K_APEX_INFRACTION_PLACE_MAX_SIZE
      K_APEX_INFRACTION_PLACE_MAX_LENGTH + 1
408
410 #define K_APEX_DOCUMENT_NAME_MAX_LENGTH 64
411
412 #define K_APEX_DOCUMENT_NAME_MAX_SIZE
      K_APEX_DOCUMENT_NAME_MAX_LENGTH + 1
413
414 /* -----
   ----- */
415 * - Type Definitions -----
   ----- */
416 * -----
   ----- */
417
422 typedef enum
423 {
425     APEX_OUT_OF_BOUNDS_TYPE_WITHIN_BOUNDS = 0x00,
426

```

```
428     APEX_OUT_OF_BOUNDS_TYPE_GPS_FAILURE = 0x01,
429
430     APEX_OUT_OF_BOUNDS_TYPE_UNKNOWN_STOP = 0x02,
431
432     APEX_OUT_OF_BOUNDS_TYPE_OTHER = 0x03,
433
434     APEX_OUT_OF_BOUNDS_TYPE_MAX_VALUE = 0x04
435
436 } ApexOutOfBoundsType;
437
438
439
440
441
442
443
444
445     typedef enum
446     {
447         APEX_SESSION_TYPE_NONE = 0x00,
448
449         APEX_SESSION_TYPE_VALIDATION = 0x01,
450
451         APEX_SESSION_TYPE_LOAD = 0x02,
452
453         APEX_SESSION_TYPE_PERSONALIZATION = 0x03,
454
455         APEX_SESSION_TYPE_MAX_VALUE = 0x04
456
457 } ApexSessionType;
458
459
460
461
462
463
464
465
466
467
468     typedef enum
469     {
470         APEX_TRANSACTION_TYPE_UNKNOWN = 0x00,
471
472         APEX_TRANSACTION_TYPE_SALE = 0x01,
473
474         APEX_TRANSACTION_TYPE_LOAD = 0x02,
475
476         APEX_TRANSACTION_TYPE_SALE_LOAD = 0x03,
477
478         APEX_TRANSACTION_TYPE_ANNUAL_SALE = 0x04,
479
480         APEX_TRANSACTION_TYPE_ANNUAL_LOAD = 0x05,
481
482         APEX_TRANSACTION_TYPE_ANNUAL_SALE_LOAD = 0x06,
483
484         APEX_TRANSACTION_TYPE_TRIP_REFUND = 0x07,
485
486         APEX_TRANSACTION_TYPE_REMOVE_CONTRACT = 0x08,
487
488         APEX_TRANSACTION_TYPE_TRANSFER = 0x09,
489
490         APEX_TRANSACTION_TYPE_ANNUAL_TRANSFER = 0x0A,
491
492         APEX_TRANSACTION_TYPE_VALIDATION = 0x0B,
493
494         APEX_TRANSACTION_TYPE_PERSONALIZATION = 0x0C,
495
496         APEX_TRANSACTION_TYPE_INVALIDATION = 0x0D,
497
498
499
500
501
502
503
504
505
506
507
508
509
510
511
```

```
513     APEX_TRANSACTION_TYPE_REHABILITATION = 0x0E,
514
516     APEX_TRANSACTION_TYPE_CONTROL = 0x0F,
517
519     APEX_TRANSACTION_TYPE_CONTROL_DECISION = 0x10,
520
522     APEX_TRANSACTION_TYPE_PRESELECTION = 0x11,
523
525     APEX_TRANSACTION_TYPE_GREENLIST_ERROR = 0x12,
526
528     APEX_TRANSACTION_TYPE_COUNTERS = 0x13,
529
531     APEX_TRANSACTION_TYPE_MAX_VALUE = 0x14
532
533 } ApexTransactionType;
534
535
540 typedef enum
541 {
550     APEX_CONTROL_ENVIRONMENT_STATUS_UNKNOWN = 0x00,
551
553     APEX_CONTROL_ENVIRONMENT_STATUS_VALID = 0x01,
554
556     APEX_CONTROL_ENVIRONMENT_STATUS_CARD_EXPIRED = 0x02,
557
559     APEX_CONTROL_ENVIRONMENT_STATUS_CARD_INVALIDATED = 0x03,
560
562     APEX_CONTROL_ENVIRONMENT_STATUS_CARD_CLEAN = 0x04,
563
565     APEX_CONTROL_ENVIRONMENT_STATUS_CARD_IN_BLACKLIST = 0x05,
566
568     APEX_CONTROL_ENVIRONMENT_STATUS_SAM_IN_BLACKLIST = 0x06,
569
571     APEX_CONTROL_ENVIRONMENT_STATUS_MAX_VALUE = 0x07
572
573 } ApexControlEnvironmentStatus;
574
575
580 typedef enum
581 {
587     APEX_CONTROL_CONTRACT_STATUS_UNKNOWN = 0x00,
588
590     APEX_CONTROL_CONTRACT_STATUS_VALID = 0x01,
591
593     APEX_CONTROL_CONTRACT_STATUS_INVALID_TEMPORAL_VALIDITY = 0x02,
594
596     APEX_CONTROL_CONTRACT_STATUS_INVALID_SPATIAL_VALIDITY = 0x03,
597
602     APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_SPATIAL_VALIDITY = 0x04,
603
605     APEX_CONTROL_CONTRACT_STATUS_INVALID_IN_OPERATOR = 0x05,
606
608     APEX_CONTROL_CONTRACT_STATUS_INVALID_UTILIZATION = 0x06,
609 }
```

```
611     APEX_CONTROL_CONTRACT_STATUS_INVALID_VALIDITY_PERIODS = 0x07,
612
614     APEX_CONTROL_CONTRACT_STATUS_VALID_BUT_NOT_VALIDATED = 0x08,
615
617     APEX_CONTROL_CONTRACT_STATUS_VALID_BUT_NOT_VALIDATED_REQUIRES_DEBIT = 0x0
618
623
624     APEX_CONTROL_CONTRACT_STATUS_VALID_BUT_NOT_VALIDATED_NOT_ENOUGH_UNITS =
625
626     0x0A,
627
632     APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED = 0x0E
633
635
636     APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED_REQUIRES_DEB
637     IT = 0x0C,
638
641
642     APEX_CONTROL_CONTRACT_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED_NOT_ENOUGH_U
643     NITS = 0x0D,
644
645     APEX_CONTROL_CONTRACT_STATUS_IN_GREYLIST = 0x0E,
646
647     APEX_CONTROL_CONTRACT_STATUS_IN_SAM_BLACKLIST = 0x0F,
648
649     APEX_CONTROL_CONTRACT_STATUS_REQUIRED_PROFILE_MISSING = 0x10,
650
651
653     APEX_CONTROL_CONTRACT_STATUS_FORBIDDEN_PROFILE = 0x11,
654
655
656     APEX_CONTROL_CONTRACT_STATUS_INVALID_CARD_UNITS = 0x12,
657
658
659     APEX_CONTROL_CONTRACT_STATUS_INVALID_VALID_DAYS = 0x13,
660
661
662     APEX_CONTROL_CONTRACT_STATUS_INVALID_MUNICIPALITY_CODE = 0x14,
663
664
665     APEX_CONTROL_CONTRACT_STATUS_MAX_VALUE = 0x15
666
667 } ApexControlContractStatus;
668
673 typedef enum
674 {
675     APEX_VALIDATION_STATUS_CONTRACT_VALID = 0x00,
676
677     APEX_VALIDATION_STATUS_ANTIPASSBACK = 0x01,
678
679     APEX_VALIDATION_STATUS_CARD_IN_BLACKLIST = 0x02,
680
681     APEX_VALIDATION_STATUS_SAM_IN_BLACKLIST = 0x03,
682
683     APEX_VALIDATION_STATUS_CARD_IN_WHITELIST = 0x04,
684
685     APEX_VALIDATION_STATUS_PROFILE_IN_WHITELIST = 0x05,
686
687
688     APEX_VALIDATION_STATUS_INTERCHANGE = 0x06,
```

```
695
697     APEX_VALIDATION_STATUS_INTERRUPTED = 0x07,
698
700     APEX_VALIDATION_STATUS_NO_VALID_CONTRACT = 0x08,
701
703     APEX_VALIDATION_STATUS_CARD_IS_INVALIDATED = 0x09,
704
712     APEX_VALIDATION_STATUS_EVENT_IS_FULL = 0x0A,
713
715     APEX_VALIDATION_STATUS_NOT_ENOUGH_UNITS = 0x0B,
716
718     APEX_VALIDATION_STATUS_CONTRACT_EXPIRED = 0x0C,
719
721     APEX_VALIDATION_STATUS_MAX_VALUE = 0x0D
722
723 } ApexValidationStatus;
724
729 typedef enum
730 {
732     APEX_CALLBACK_STATUS_OK = 0x00,
733
735     APEX_CALLBACK_STATUS_CANCEL = 0x01,
736
738     APEX_CALLBACK_STATUS_ERROR = 0x02,
739
741     APEX_CALLBACK_STATUS_MAX_VALUE = 0x03
742
743 } ApexCallbackStatus;
744
749 typedef enum {
750
760     APEX_CONFIGURE_PRODUCT_MODE_SALE = 0x00,
761
771     APEX_CONFIGURE_PRODUCT_MODE_LOAD = 0x01,
772
782     APEX_CONFIGURE_PRODUCT_MODE_SALE_LOAD = 0x02,
783
791     APEX_CONFIGURE_PRODUCT_MODE_TRANSFER_CATALOG = 0x03,
792
804     APEX_CONFIGURE_PRODUCT_MODE_TRANSFER_BINARY = 0x04,
805
807     APEX_CONFIGURE_PRODUCT_MODE_MAX_VALUE = 0x05
808
809 } ApexConfigureProductMode;
810
815 typedef enum {
816
818     APEX_CONFIGURE_PRODUCT_STATUS_VALID = 0x00,
819
821     APEX_CONFIGURE_PRODUCT_STATUS_INVALID_SALES_PACKAGE_SELECTION = 0x01,
822
824     APEX_CONFIGURE_PRODUCT_STATUS_INVALID_PRODUCT_QUANTITY = 0x02,
825
827     APEX_CONFIGURE_PRODUCT_STATUS_INVALID_START_DATE = 0x03,
```

```
828
830     APEX_CONFIGURE_PRODUCT_STATUS_INVALID_ZONE_SELECTION = 0x04,
831
833     APEX_CONFIGURE_PRODUCT_STATUS_INVALID_SPATIAL_VALIDITY_SELECTION
= 0x05,
834
836     APEX_CONFIGURE_PRODUCT_STATUS_CONTRACT_VALIDITY_EXCEEDS_CARD_VALIDITY =
0x06,
837
839     APEX_CONFIGURE_PRODUCT_STATUS_CONFIGURED_PRODUCT_ALREADY_EXISTS =
0x07,
840
842     APEX_CONFIGURE_PRODUCT_STATUS_CONFIGURED_PRODUCT_DOES_NOT_EXIST =
0x08,
843
845     APEX_CONFIGURE_PRODUCT_STATUS_INVALID_VOUCHER = 0x09,
846
848     APEX_CONFIGURE_PRODUCT_STATUS_INVALID_CARD_SERIAL_NUMBER = 0x0A,
849
851     APEX_CONFIGURE_PRODUCT_STATUS_INVALID_CARD_TYPE_ID = 0x0B,
852
854     APEX_CONFIGURE_PRODUCT_STATUS_RELOAD_NOT_YET_AVAILABLE = 0x0C,
855
857     APEX_CONFIGURE_PRODUCT_STATUS_REQUIRED_PRODUCT_NOT_VALID_TEMPORALLY = 0x0
858
860     APEX_CONFIGURE_PRODUCT_STATUS_UNMET_PROFILE_CONDITIONS = 0x0E,
861
863     APEX_CONFIGURE_PRODUCT_STATUS_MAX_VALUE = 0x0F
864
865 } ApexConfigureProductStatus;
866
867
872 typedef enum
873 {
881     APEX_PRODUCT_PARAM_TYPE_SALES_PACKAGE = 0x00,
882
889     APEX_PRODUCT_PARAM_TYPE_PRODUCT_QUANTITY = 0x01,
890
897     APEX_PRODUCT_PARAM_TYPE_START_DATE = 0x02,
898
906     APEX_PRODUCT_PARAM_TYPE_ZONE = 0x03,
907
915     APEX_PRODUCT_PARAM_TYPE_SPATIAL_VALIDITY = 0x04,
916
923     APEX_PRODUCT_PARAM_TYPE_VOUCHER = 0x05,
924
931     APEX_PRODUCT_PARAM_TYPE_CARD_SERIAL_NUMBER = 0x06,
932
939     APEX_PRODUCT_PARAM_TYPE_CARD_TYPE_ID = 0x07,
940
942     APEX_PRODUCT_PARAM_TYPE_MAX_VALUE = 0x08
943
```

```
944 } ApexProductParamType;
945
946
951 typedef enum
952 {
954     APEX_DOCUMENT_TYPE_UNDEFINED = 0x00,
955
957     APEX_DOCUMENT_TYPE_CITIZEN_CARD = 0x01,
958
960     APEX_DOCUMENT_TYPE_IDENTITY_CARD = 0x02,
961
963     APEX_DOCUMENT_TYPE_FINE_NOTIFICATION = 0x03,
964
966     APEX_DOCUMENT_TYPE_OTHER = 0x04,
967
969     APEX_DOCUMENT_TYPE_MAX_VALUE = 0x05
970
971 } ApexDocumentType;
972
973
978 typedef enum
979 {
981     APEX_PAYMENT_METHOD_UNDEFINED = 0x00,
982
984     APEX_PAYMENT_METHOD_MULTIPLE_MEANS = 0x01,
985
987     APEX_PAYMENT_METHOD_CASH = 0x02,
988
990     APEX_PAYMENT_METHOD_CREDIT_CARD = 0x03,
991
993     APEX_PAYMENT_METHOD_ACCOUNT_DEBIT = 0x04,
994
996     APEX_PAYMENT_METHOD_PMB = 0x05,
997
999     APEX_PAYMENT_METHOD_MB = 0x06,
1000
1002     APEX_PAYMENT_METHOD_VOUCHER = 0x07,
1003
1005     APEX_PAYMENT_METHOD_MAX_VALUE = 0x08
1006
1007 } ApexPaymentMethod;
1008
1013 typedef enum {
1014
1016     APEX_PRESELECTION_TYPE_OPTIONAL = 0x00,
1017
1019     APEX_PRESELECTION_TYPE_REQUIRED = 0x01,
1020
1022     APEX_PRESELECTION_TYPE_NOT_ALLOWED = 0x02,
1023
1025     APEX_PRESELECTION_TYPE_MAX_VALUE = 0x03
1026
1027 } ApexPreSelectionType;
1028
```

```
1033 typedef enum {
1034
1036     APEX_PRESELECTION_OD_TYPE_NOT_ALLOWED = 0x00,
1037
1039     APEX_PRESELECTION_OD_TYPE_REQUIRED = 0x01,
1040
1042     APEX_PRESELECTION_OD_TYPE_OPTIONAL = 0x02,
1043
1045     APEX_PRESELECTION_OD_TYPE_MAX_VALUE = 0x03
1046
1047 } ApexPreSelectionODType;
1048
1053 typedef enum
1054 {
1056     APEX_ANTIPASSBACK_NORMAL = 0,
1057
1059     APEX_ANTIPASSBACK_SKIP = 1,
1060
1062     APEX_ANTIPASSBACK_MAX_VALUE = 2
1063
1064 } ApexAntipassbackMode;
1065
1066
1071     typedef enum
1072 {
1074     APEX_COUNTERS_TRANSACTION_CONTEXT_FIRST_TRANSACTION = 0,
1075
1077     APEX_COUNTERS_TRANSACTION_CONTEXT_MIDDLE_TRANSACTION = 1
1078
1079 } ApexCountersTransactionContext;
1080
1081
1086     typedef struct
1087 {
1095         T_S8 fileFormatVersion[K_APEX_FILE_VERSION_MAX_SIZE];
1096
1104         T_S8 fileVersion[K_APEX_FILE_VERSION_MAX_SIZE];
1105
1107         T_UtilDateTime fileDate;
1108
1110         T_UtilDateTime fileStartDate;
1111
1113         T_UtilDateTime fileEndDate;
1114
1123         T_S8 apexMinVersion[K_APEX_LIBRARY_VERSION_MAX_SIZE];
1124
1125 } ApexFileInfo;
1126
1131     typedef struct
1132 {
1134         T_S8 id[K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE];
1135
1137         T_S8 description[K_APEX_INFRACTION_ATTRIBUTE_DESCRIPTION_MAX_SIZE];
1138 }
```

```
1139 } ApexInfractionAttribute;
1140
1145 typedef struct
1146 {
1148     T_S8 id[K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE];
1149
1151     T_S8 description[K_APEX_FINE_ATTRIBUTE_DESCRIPTION_MAX_SIZE];
1152
1153 } ApexFineAttribute;
1154
1162 typedef struct
1163 {
1171     T_U8 id;
1172
1181     T_CscType cscType;
1182
1188     T_S8 readerAddress[K_APEX_READER_ADDRESS_MAX_SIZE];
1189
1191     T_U8 antennaNumber;
1192
1194     T_SearchMode searchMode;
1195
1201     T_CalypsoNativeMode calypsoNativeMode;
1202
1208     T_CouplerConfiguration* couplerConfiguration;
1209
1210 } ApexCardReaderConfig;
1211
1212
1220 typedef struct
1221 {
1229     T_U8 id;
1230
1232     T_S8 samTypeId[K_APEX_SAM_TYPE_ID_MAX_SIZE];
1233
1242     T_CscType cscType;
1243
1249     T_S8 readerAddress[K_APEX_READER_ADDRESS_MAX_SIZE];
1250
1252     T_U8 slotNumber;
1253
1259     T_U16 samAttrLen;
1260
1266     T_U8 samAttr[K_ATTR_MAX_LENGTH];
1267
1273     T_CouplerConfiguration* couplerConfiguration;
1274
1275 } ApexSamReaderConfig;
1276
1281 typedef struct {
1282
1284     T_S8 profileId[K_APEX_PROFILE_ID_MAX_SIZE];
1285
1291     T_S8 profileName[K_APEX_PROFILE_NAME_MAX_SIZE];
```

```
1292
1293 } ApexProfile;
1294
1299 typedef struct
1300 {
1302     T_U16 profileNumber;
1303
1305     T_S8 profileId[K_APEX_PROFILE_ID_MAX_SIZE];
1306
1312     T_S8 profileName[K_APEX_PROFILE_NAME_MAX_SIZE];
1313
1315     T_UtilDate startDate;
1316
1318     T_UtilDate endDate;
1319
1320 } ApexCardProfile;
1321
1394 typedef struct
1395 {
1401     T_S8 applicationIssuerId[K_APEX_OPERATOR_ID_MAX_SIZE];
1402
1409     T_U16 applicationIssuerCode;
1410
1416     T_S8 applicationIssuerName[K_APEX_OPERATOR_NAME_MAX_SIZE];
1417
1423     T_S8 applicationIssuerShortName[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE];
1424
1426     T_S8 networkId[K_APEX_NETWORK_ID_MAX_SIZE];
1427
1434     T_U32 cardNumber;
1435
1437     T_VivaMediaType mediaType;
1438
1440     T_VivaGraphicalLayout graphicalLayout;
1441
1443     T_UtilDate issuingDate;
1444
1446     T_UtilDate endDate;
1447
1449     T_UtilDate rehabilitationDate;
1450
1452     T_U16 countryCode;
1453
1455     T_U16 currencyCode;
1456
1458     T_U16 holderCompany;
1459
1466     T_S8 holderCompanyName[K_APEX_OPERATOR_NAME_MAX_SIZE];
1467
1474     T_S8 holderCompanyShortName[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE];
1475
1477     T_U32 holderNumber;
1478
1480     T_UtilDate holderBirthDate;
```

```
1481
1483     T_U16 profilesCount;
1484
1491     ApexCardProfile* profilesArray;
1492
1494     T_U8 issuerDataSize;
1495
1506     T_U8 issuerData[K_APEX_ISSUER_DATA_MAX_SIZE];
1507
1508 } ApexEnvironment;
1509
1513 typedef struct {
1514
1516     T_S8 operatorId[K_APEX_OPERATOR_ID_MAX_SIZE];
1517
1519     T_S8 operatorName[K_APEX_OPERATOR_NAME_MAX_SIZE];
1520
1522     T_S8 operatorShortName[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE];
1523
1524 } ApexOperator;
1525
1529 typedef struct {
1530
1532     T_S8 zoneId[K_APEX_ZONE_ID_MAX_SIZE];
1533
1535     T_S8 zoneName[K_APEX_ZONE_NAME_MAX_SIZE];
1536
1537 } ApexZone;
1538
1542 typedef struct {
1543
1545     T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE];
1546
1548     T_S8 lineName[K_APEX_LINE_NAME_MAX_SIZE];
1549
1550 } ApexLine;
1551
1555 typedef struct {
1556
1558     T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE];
1559
1561     T_S8 patternName[K_APEX_PATTERN_NAME_MAX_SIZE];
1562
1563 } ApexPattern;
1564
1568 typedef struct {
1569
1571     T_S8 stopId[K_APEX_STOP_ID_MAX_SIZE];
1572
1574     T_S8 stopName[K_APEX_STOP_NAME_MAX_SIZE];
1575
1576 } ApexStop;
1577
1581 typedef struct {
```

```
1582
1588     ApexZone originZone;
1589
1595     ApexZone destinationZone;
1596
1602     ApexLine line;
1603
1609     ApexPattern pattern;
1610
1616     ApexStop stop;
1617
1623     ApexZone via;
1624
1625 } ApexMatrixElement;
1626
1630 typedef struct
1631 {
1633     T_U16 operatorsCount;
1634
1636     ApexOperator* operatorsArray;
1637
1639     T_U16 availableZonesCount;
1640
1642     ApexZone* availableZonesArray;
1643
1645     T_U8 zonesNumberFromStart;
1646
1648     T_U16 matrixElementsCount;
1649
1651     ApexMatrixElement* matrixElementsArray;
1652
1653 } ApexSpatialValidity;
1654
1658 typedef enum
1659 {
1661     APEX_TRIP_CLASS_UNDEFINED = 0x00,
1662
1664     APEX_TRIP_CLASS_FIRST_CLASS = 0x01,
1665
1667     APEX_TRIP_CLASS_SECOND_CLASS = 0x02,
1668
1670     APEX_TRIP_CLASS_MAX_VALUE = 0x03
1671
1672 } ApexTripClass;
1673
1674
1679 typedef enum
1680 {
1682     APEX_CONTRACT_DURATION_TYPE_NO_LIMIT = 0x00,
1683
1685     APEX_CONTRACT_DURATION_TYPE_LAST_DAY_OF_YEAR = 0x01,
1686
1688     APEX_CONTRACT_DURATION_TYPE_MONTHS = 0x02,
1689 }
```

```
1691     APEX_CONTRACT_DURATION_TYPE_DAYS = 0x03,
1692
1694     APEX_CONTRACT_DURATION_TYPE_HOURS = 0x04,
1695
1697     APEX_CONTRACT_DURATION_TYPE_HALF_HOURS = 0x05,
1698
1700     APEX_CONTRACT_DURATION_TYPE_MINUTES = 0x06,
1701
1703     APEX_CONTRACT_DURATION_TYPE_MAX_VALUE = 0x07
1704
1705 } ApexContractDurationType;
1706
1707
1712 typedef enum
1713 {
1715     APEX_TRIP_DURATION_TYPE_END_OF_EXPLORATION = 0x00,
1716
1718     APEX_TRIP_DURATION_TYPE_CURRENT_TRIP = 0x01,
1719
1721     APEX_TRIP_DURATION_TYPE_MONTHS = 0x02,
1722
1724     APEX_TRIP_DURATION_TYPE_DAYS = 0x03,
1725
1727     APEX_TRIP_DURATION_TYPE_HOURS = 0x04,
1728
1730     APEX_TRIP_DURATION_TYPE_HALF_HOURS = 0x05,
1731
1733     APEX_TRIP_DURATION_TYPE_MINUTES = 0x06,
1734
1736     APEX_TRIP_DURATION_TYPE_END_OF_DAY = 0x07,
1737
1739     APEX_TRIP_DURATION_TYPE_MAX_VALUE = 0x08
1740
1741 } ApexTripDurationType;
1742
1743
1747 typedef struct
1748 {
1750     T_UtilDateTime validityStartTime;
1751
1753     ApexContractDurationType contractDurationType;
1754
1756     T_U16 contractDuration;
1757
1759     ApexTripDurationType tripDurationType;
1760
1762     T_U16 tripDuration;
1763
1764 } ApexContractTemporalValidity;
1765
1766
1770 typedef enum
1771 {
1773     APEX_UNIT_TYPE_NONE = 0x00,
```

```

1774
1776     APEX_UNIT_TYPE_TRIPS = 0x01,
1777
1779     APEX_UNIT_TYPE_STORED_VALUE = 0x02,
1780
1782     APEX_UNIT_TYPE_MAX_VALUE = 0x03
1783
1784 } ApexUnitType;
1785
1786
1791 typedef enum
1792 {
1794     APEX_MATERIALIZATION_TYPE_CONTACTLESS_ONLY = 0x00,
1795
1797     APEX_MATERIALIZATION_TYPE_MOBILE_ONLY = 0x01,
1798
1800     APEX_MATERIALIZATION_TYPE_PRINTED = 0x02,
1801
1803     APEX_MATERIALIZATION_TYPE_CONTACTLESS_MOBILE = 0x03,
1804
1806     APEX_MATERIALIZATION_TYPE_OTHER = 0x04,
1807
1809     APEX_MATERIALIZATION_TYPE_VOUCHER = 0x05,
1810
1812     APEX_MATERIALIZATION_TYPE_MAX_VALUE = 0x06
1813
1814 } ApexMaterializationType;
1815
1816
1820 typedef struct
1821 {
1823     ApexUnitType unitType;
1824
1826     ApexMaterializationType materializationType;
1827
1829     T_VivaContractRightExtensionType rightExtensionType;
1830
1832     ApexTripClass tripClass;
1833
1835     T_U8 groupDimension;
1836
1842     T_U16 timeBetweenPassengers;
1843
1845     T_U16 dailyUsageRate;
1846
1848     ApexPreSelectionType preSelectionType;
1849
1857     ApexPreSelectionODType preSelectionODType;
1858
1859 } ApexContractCharacteristics;
1860
1864 typedef struct
1865 {
1867     T_VivaContractUtilization utilization;

```

```
1868
1870     T_U16 maxDailyUsage;
1871
1872 } ApexContractRestrictions;
1873
1879 typedef enum {
1880
1882     APEX_PRE_VALIDATION_STATUS_UNKNOWN = 0x00,
1883
1889     APEX_PRE_VALIDATION_STATUS_VALID = 0x01,
1890
1892     APEX_PRE_VALIDATION_STATUS_EXPIRED = 0x02,
1893
1895     APEX_PRE_VALIDATION_STATUS_MAX_VALUE = 0x03,
1896
1897 } ApexPreValidationStatus;
1898
1902 typedef struct
1903 {
1905     T_U16 contractNumber;
1906
1908     T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE];
1909
1911     T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE];
1912
1914     ApexOperator saleOperator;
1915
1917     T_S8 networkId[K_APEX_NETWORK_ID_MAX_SIZE];
1918
1920     T_UtilDate saleDate;
1921
1923     ApexContractTemporalValidity temporalValidity;
1924
1926     ApexContractCharacteristics characteristics;
1927
1929     ApexContractRestrictions restrictions;
1930
1932     T_U8 interchangeAllowedFlag;
1933
1935     T_U32 saleCount;
1936
1938     T_U32 saleSamMachineId;
1939
1941     T_U16 spatialValiditiesCount;
1942
1944     ApexSpatialValidity* spatialValiditiesArray;
1945
1947     T_U32 contractUnits;
1948
1950     T_VivaContractRestrictTime restrictTime;
1951
1957     T_U8 contractInGreylistFlag;
1958
1964     T_U8 samInBlacklistFlag;
```

```
1965
1967     T_U16 requiredContractNumber;
1968
1976     ApexPreValidationStatus preValidationStatus;
1977
1983     T_U8 allowsReloadFlag;
1984
1985 } ApexContract;
1986
1987
1991 typedef struct {
1992
1994     T_U8 contractNumber;
1995
1997     T_UtilDateTime firstDateTime;
1998
2000     T_U8 usageData;
2001
2003     T_U8 periodStart;
2004
2006     T_U8 periodRemainingTrips;
2007
2008 } ApexEventContractUsage;
2009
2010
2014 typedef struct
2015 {
2017     T_UtilDateTime eventDateTime;
2018
2020     T_VivaEventType eventType;
2021
2023     T_S8 eventOperatorId[K_APEX_OPERATOR_ID_MAX_SIZE];
2024
2026     T_S8 networkId[K_APEX_NETWORK_ID_MAX_SIZE];
2027
2029     T_U8 journeyInterchanges;
2030
2032     T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE];
2033
2035     T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE];
2036
2038     T_S8 stopId[K_APEX_STOP_ID_MAX_SIZE];
2039
2041     T_U16 vehicleId;
2042
2048     T_S8 originZoneId[K_APEX_ZONE_ID_MAX_SIZE];
2049
2055     T_S8 destinationZoneId[K_APEX_ZONE_ID_MAX_SIZE];
2056
2064     T_U16 contractsUsedMask;
2065
2067     T_U8 profilesUsedMask;
2068
2070     T_U32 deviceId;
```

```
2071
2073     T_U16 eventContractUsageCount;
2074
2076     ApexEventContractUsage* eventContractUsageArray;
2077
2079     T_U8 issuerDataSize;
2080
2082     T_U8 issuerData[K_APEX_ISSUER_DATA_MAX_SIZE];
2083
2084 } ApexEvent;
2085
2086
2103 typedef struct
2104 {
2106     T_U32 civilNumber;
2107
2109     T_U32 vatNumber;
2110
2112     T_S8 name[K_APEX HOLDER_NAME_MAX_SIZE];
2113
2115     T_U8 issuerDataSize;
2116
2118     T_U8 issuerData[K_APEX_ISSUER_DATA_MAX_SIZE];
2119
2120 } ApexHolderId;
2121
2122
2126 typedef struct
2127 {
2129     T_U32 value;
2130
2132     T_UtilDate startDate;
2133
2135     T_UtilDate endDate;
2136
2138     T_UtilDate loadEndDate;
2139
2140 } ApexLoyaltyOperatorRecord;
2141
2142
2146 typedef struct
2147 {
2149     ApexOperator loyaltyOperator;
2150
2152     T_U8 clientLevel;
2153
2155     T_U16 recordsCount;
2156
2158     ApexLoyaltyOperatorRecord* recordsArray;
2159
2160 } ApexLoyaltyOperatorData;
2161
2162
2166 typedef struct
```

```
2167 {  
2169     T_U16 loyaltyDataNumber;  
2170  
2172     T_U16 operatorDataCount;  
2173  
2175     ApexLoyaltyOperatorData* operatordataArray;  
2176  
2177 } ApexLoyaltyData;  
2178  
2182 typedef struct  
2183 {  
2185     T_UtilDateTime eventDateTime;  
2186  
2188     T_VivaEventType eventType;  
2189  
2191     T_UtilDate exitDateLimit;  
2192  
2194     T_UtilTime exitTimeLimit;  
2195  
2197     T_S8 eventOperatorId[K_APEX_OPERATOR_ID_MAX_SIZE];  
2198  
2200     T_S8 networkId[K_APEX_NETWORK_ID_MAX_SIZE];  
2201  
2203     T_U16 locationId;  
2204  
2206     T_U16 contractsUsedMask;  
2207  
2209     T_U8 profilesUsedMask;  
2210  
2212     T_U32 deviceId;  
2213  
2215     T_U16 priceAmount;  
2216  
2218     T_U16 eventContractUsageCount;  
2219  
2221     ApexEventContractUsage* eventContractUsageArray;  
2222  
2223 } ApexParkData;  
2224  
2225  
2230 typedef struct  
2231 {  
2233     ApexEnvironment environment;  
2234  
2236     ApexHolderId holderId;  
2237  
2239     T_U16 maxContracts;  
2240  
2242     T_U16 contractsCount;  
2243  
2245     ApexContract* contractsArray;  
2246  
2248     ApexEvent event;  
2249 }
```

```
2250 } ApexCardData;
2251
2252
2253 typedef struct
2254 {
2255     T_U16 loyaltyRecordsCount;
2256
2257     ApexLoyaltyData* loyaltyRecordsArray;
2258
2259     ApexParkData parkData;
2260
2261 } ApexCardDataExtra;
2262
2263
2264
2265
2266
2267
2268
2269
2270
2271
2272
2273
2274
2275
2276
2277
2278 typedef enum
2279 {
2280     APEX_ISSUE_MODE_ENVIRONMENT HOLDER_ID = 0x00,
2281
2282     APEX_ISSUE_MODE_ENVIRONMENT = 0x01,
2283
2284     APEX_ISSUE_MODE HOLDER_ID = 0x02,
2285
2286
2287     APEX_ISSUE_MODE_FULL = 0x03,
2288
2289
2290     APEX_ISSUE_MODE_MAX_VALUE = 0x04
2291
2292
2293
2294
2295 } ApexIssueMode;
2296
2297
2298
2299
2300
2301
2302 typedef struct
2303 {
2304     ApexIssueMode issueMode;
2305
2306     ApexEnvironment issueEnvironment;
2307
2308     ApexHolderId issueHolderId;
2309
2310
2311
2312
2313 } ApexIssueData;
2314
2315
2316
2317
2318
2319
2320 typedef struct
2321 {
2322     T_CardPhysicalType cardPhysicalType;
2323
2324     T_CardDataModel cardDataModel;
2325
2326     T_U64 cardSerialNumber;
2327
2328     T_CardValidityState cardValidityState;
2329
2330     T_S8 cardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE];
2331
2332
2333
2334
2335
2336
2337
2338
2339
2340
2341
2342
2343
2344
2345
2346
2347
2348
2349
2350
2351
2352 } ApexCardInfo;
2353
```

```
2354
2358 typedef enum
2359 {
2361     APEX_STATUS_NO_ERROR = 0x0000,
2362
2364     APEX_STATUS_CONTEXT_ERROR = 0x0001,
2365
2371     APEX_STATUS_PARAMETER_ERROR = 0x0002,
2372
2378     APEX_STATUS_NULL_PARAMETER = 0x0003,
2379
2381     APEX_STATUS_INVALID_CALLBACK_ERROR = 0x0004,
2382
2390     APEX_STATUS_LIBRARY_NOT_INITIALIZED_ERROR = 0x0005,
2391
2397     APEX_STATUS_MEMORY_ALLOCATION_ERROR = 0x0006,
2398
2400     APEX_STATUS_BUFFER_SIZE_ERROR = 0x0007,
2401
2407     APEX_STATUS_CONFIGURATION_FILE_PARSER_ERROR = 0x0008,
2408
2414     APEX_STATUS_API_VIVA_ERROR = 0x0009,
2415
2423     APEX_STATUS_CARD_CLEAN = 0x000A,
2424
2430     APEX_STATUS_UNSUPPORTED_CARD_OPERATION_ERROR = 0x000B,
2431
2435     APEX_STATUS_INVALID_CARD_DATA_MODEL = 0x000C,
2436
2438     APEX_STATUS_INVALID_CARD_TYPE_ID = 0x000D,
2439
2441     APEX_STATUS_CARD_NOT_DETECTED = 0x000E,
2442
2444     APEX_STATUS_INCORRECT_CARD_TYPE_DETECTED = 0x000F,
2445
2453     APEX_STATUS_CARD_READER_UNAVAILABLE = 0x0010,
2454
2462     APEX_STATUS_CARD_READER_ERROR = 0x0011,
2463
2471     APEX_STATUS_SAM_READER_ERROR = 0x0012,
2472
2478     APEX_STATUS_CARD_READER_CONNECTION_ERROR = 0x0013,
2479
2485     APEX_STATUS_SAM_READER_CONNECTION_ERROR = 0x0014,
2486
2501     APEX_STATUS_INVALID_CARD_SAM_ASSOCIATION = 0x0015,
2502
2508     APEX_STATUS_INCOMPATIBLE_READER_CONFIGURATION = 0x0016,
2509
2511     APEX_STATUS_INVALID_PRODUCT_SELECTION = 0x0017,
2512
2521     APEX_STATUS_INVALID_CONFIGURATION_ID = 0x0018,
2522
2531     APEX_STATUS_INVALID_PRODUCT_CONFIGURATION = 0x0019,
```

```
2532  
2534 APEX_STATUS_INVALID_CONTRACT_NUMBER = 0x001A,  
2535  
2537 APEX_STATUS_INVALID_SERVICE_LOCATION = 0x001B,  
2538  
2540 APEX_STATUS_INTERRUPTED_TRANSACTION = 0x001C,  
2541  
2543 APEX_STATUS_INVALID_SIGNATURE = 0x001D,  
2544  
2546 APEX_STATUS_DATAMODEL_ENCODING_OVERFLOW = 0x001E,  
2547  
2554 APEX_STATUS_OPERATION_ERROR = 0x001F,  
2555  
2557 APEX_STATUS_NO_EXPLORATION_PERIOD = 0x0020,  
2558  
2564 APEX_STATUS_DATA_CONVERSION_ERROR = 0x0021,  
2565  
2571 APEX_STATUS_CONFIGURATION_ERROR = 0x0022,  
2572  
2574 APEX_STATUS_MISSING_CARD_READ = 0x0023,  
2575  
2577 APEX_STATUS_INVALID_CARD_DATA = 0x0024,  
2578  
2580 APEX_STATUS_PRESELECTION_NOT_ALLOWED = 0x0025,  
2581  
2588 APEX_STATUS_UNKNOWN_TRANSACTION_ID = 0x0026,  
2589  
2591 APEX_STATUS_LIBRARY_ALREADY_INITIALIZED_ERROR = 0x0027,  
2592  
2594 APEX_STATUS_UNSUPPORTED_PRODUCT_OPERATION_ERROR = 0x0028,  
2595  
2597 APEX_STATUS_CARD_IN_BLACKLIST = 0x0029,  
2598  
2600 APEX_STATUS_CARD_INVALIDATED = 0x002A,  
2601  
2603 APEX_STATUS_LOAD_SEQUENCE_FILE_ERROR = 0x002B,  
2604  
2606 APEX_STATUS_UNSUPPORTED_SAM_OPERATION_ERROR = 0x002C,  
2607  
2609 APEX_STATUS_UNSUPPORTED_SAM_CARD_TYPE_ERROR = 0x002D,  
2610  
2612 APEX_STATUS_OPERATION_ABORTED = 0x002E,  
2613  
2615 APEX_STATUS_CONTRACT_IN_GREYLIST = 0x002F,  
2616  
2618 APEX_STATUS_SAM_IN_BLACKLIST = 0x0030,  
2619  
2621 APEX_STATUS_TRANSACTION_NOT_SIGNED = 0x0031,  
2622  
2624 APEX_STATUS_INVALID_TRANSACTION = 0x0032,  
2625  
2627 APEX_STATUS_OPERATION_ACCESS_DENIED = 0x0033,  
2628  
2630 APEX_STATUS_LOCKED = 0x0034,
```

```
2631
2633     APEX_STATUS_INVALID_KEY = 0x0035,
2634
2636     APEX_STATUS_MAX_VALUE = 0x0036
2637
2638 } ApexStatus;
2639
2640
2646 typedef enum
2647 {
2649     APEX_DETAILED_STATUS_NO_DETAIL = 0x00,
2650
2652     APEX_DETAILED_STATUS_FILE_PARSER_NOT_INITIALIZED_ERROR = 0x01,
2653
2655     APEX_DETAILED_STATUS_FILE_PARSER_CALLBACK_ERROR = 0x02,
2656
2658     APEX_DETAILED_STATUS_FILE_OPEN_ERROR = 0x03,
2659
2661     APEX_DETAILED_STATUS_FILE_READ_ERROR = 0x04,
2662
2664     APEX_DETAILED_STATUS_EMPTY_FILE_ERROR = 0x05,
2665
2667
2668     APEX_DETAILED_STATUS_TECHNICAL_PARAMETERS_CONFIGURATION_FILE_ERROR = 0x06
2669
2670     APEX_DETAILED_STATUS_NETWORK_CONFIGURATION_FILE_ERROR = 0x07,
2671
2673     APEX_DETAILED_STATUS_COMMERCIAL_OFFER_CONFIGURATION_FILE_ERROR = 0x08
2674
2676     APEX_DETAILED_STATUS_ACTION_LISTS_CONFIGURATION_FILE_ERROR = 0x09,
2677
2679     APEX_DETAILED_STATUS_INVALID_CARD_READER = 0x0A,
2680
2682     APEX_DETAILED_STATUS_INVALID_SAM_READER = 0x0B,
2683
2685     APEX_DETAILED_STATUS_INPUT_DATA_CHANGED = 0x0C,
2686
2688     APEX_DETAILED_STATUS_UNMET_PRODUCT_CONDITIONS = 0x0D,
2689
2691     APEX_DETAILED_STATUS_UNMET_PROFILE_CONDITIONS = 0x0E,
2692
2694     APEX_DETAILED_STATUS_DATA_CORRUPTION_DETECTED = 0x0F,
2695
2697     APEX_DETAILED_STATUS_INVALID_CARD_PRODUCT_CONFIGURATION = 0x10,
2698
2700     APEX_DETAILED_STATUS_UNKNOWN_PRODUCT = 0x11,
2701
2703     APEX_DETAILED_STATUS_CARD_EXPIRED = 0x12,
2704
2706     APEX_DETAILED_STATUS_CARD_FULL = 0x13,
2707
2709     APEX_DETAILED_STATUS_OUTSIDE_SALE_PERIOD = 0x14,
2710
2712     APEX_DETAILED_STATUS_INVALID_TRANSACTION_TYPE = 0x15,
```

```
2713  
2715 APEX_DETAILED_STATUS_DIFFERENT_CARD_DETECTED = 0x16,  
2716  
2718 APEX_DETAILED_STATUS_REFUND_NOT_AVAILABLE = 0x17,  
2719  
2721 APEX_DETAILED_STATUS_DIFFERENT_PRODUCT_DETECTED = 0x18,  
2722  
2724 APEX_DETAILED_STATUS_MISSING_PHYSICAL_SUPPORT_PRODUCT = 0x19,  
2725  
2727 APEX_DETAILED_STATUS_TEMPORAL_VALIDITY_OVERFLOW = 0x1A,  
2728  
2730 APEX_DETAILED_STATUS_MAX_VALIDITY_OR_UNITS_REACHED = 0x1B,  
2731  
2733 APEX_DETAILED_STATUS_LOAD_SEQUENCE_CALLBACK_ERROR = 0x1C,  
2734  
2736 APEX_DETAILED_STATUS_NON_ELIGIBLE_PRODUCT = 0x1D,  
2737  
2739 APEX_DETAILED_STATUS_DUPLICATE_CONTRACT = 0x1E,  
2740  
2742 APEX_DETAILED_STATUS_CONTRACT_ALREADY_TRANSFERRED = 0x1F,  
2743  
2745 APEX_DETAILED_STATUS_INVALID_QUANTITY = 0x20,  
2746  
2748 APEX_DETAILED_STATUS_UNEXPECTED_PRODUCT_CONFIGURATION = 0x21,  
2749  
2751 APEX_DETAILED_STATUS_MISSING_PAPER_SALE_CACHE = 0x22,  
2752  
2754 APEX_DETAILED_STATUS_DIFFERENT_CARD_DATA_DETECTED = 0x23,  
2755  
2757 APEX_DETAILED_STATUS_PRODUCT_ALREADY_USED = 0x24,  
2758  
2760 APEX_DETAILED_STATUS_NO_PENDING_INTERRUPTED_TRANSACTION = 0x25,  
2761  
2763 APEX_DETAILED_STATUS_DATA_MODEL_ERROR = 0x26,  
2764  
2766 APEX_DETAILED_STATUS_INVALID_CARD_TYPE = 0x27,  
2767  
2769 APEX_DETAILED_STATUS_ONLINE_CHECK_REJECTED = 0x28,  
2770  
2772 APEX_DETAILED_STATUS_ONLINE_CHECK_FAILED = 0x29,  
2773  
2775 APEX_DETAILED_STATUS_SAME_CONTRACT_ALREADY_LOADED_TODAY = 0x2A,  
2776  
2778 APEX_DETAILED_STATUS_CONTRACT_TEMPORAL_VALIDITY_TOO_LONG = 0x2B,  
2779  
2781 APEX_DETAILED_STATUS_UNABLE_TO_CONFIGURE_PRODUCT = 0x002C,  
2782  
2784 APEX_DETAILED_STATUS_NO_VALID_SALES_PACKAGES = 0x002D,  
2785  
2797 APEX_DETAILED_STATUS_PROFILE_ERROR = 0x002E,  
2798  
2800 APEX_DETAILED_STATUS_MISSING_ACTION_LISTS_CALLBACK = 0x002F,  
2801  
2803 APEX_DETAILED_STATUS_CHECK_BLACKLIST_CARD_CALLBACK_ERROR = 0x0030,
```

```
2804  
2806     APEX_DETAILED_STATUS_CHECK_BLACKLIST_SAM_CALLBACK_ERROR = 0x0031,  
2807  
2809     APEX_DETAILED_STATUS_CHECK_GREYLIST_CALLBACK_ERROR = 0x0032,  
2810  
2812     APEX_DETAILED_STATUS_CHECK_WHITELIST_PROFILE_CALLBACK_ERROR = 0x003  
2813  
2815     APEX_DETAILED_STATUS_CHECK_WHITELIST_CARD_CALLBACK_ERROR = 0x0034,  
2816  
2818     APEX_DETAILED_STATUS_CHECK_GREENLIST_CALLBACK_ERROR = 0x0035,  
2819  
2826     APEX_DETAILED_STATUS_CARD_READER_COUNT_ERROR = 0x0036,  
2827  
2834     APEX_DETAILED_STATUS_SAM_READER_COUNT_ERROR = 0x0037,  
2835  
2837     APEX_DETAILED_STATUS_CARD_READER_ID_ALREADY_EXISTS_ERROR = 0x0038,  
2838  
2840     APEX_DETAILED_STATUS_SAM_READER_ID_ALREADY_EXISTS_ERROR = 0x0039,  
2841  
2843     APEX_DETAILED_STATUS_NO_VALID_ZONE_SELECTION = 0x003A,  
2844  
2846     APEX_DETAILED_STATUS_NO_VALID_SPATIAL_VALIDITY_SELECTION = 0x003B,  
2847  
2849     APEX_DETAILED_STATUS_CONTRACT_VALIDITY_EXCEEDS_CARD_VALIDITY = 0x0C  
2850  
2852     APEX_DETAILED_STATUS_PRODUCT_ALREADY_EXISTS = 0x003D,  
2853  
2855     APEX_DETAILED_STATUS_PRODUCT_TO_RELOAD_MISSING = 0x003E,  
2856  
2858     APEX_DETAILED_STATUS_FILE_PARSER_CHECKSUM_ERROR = 0x003F,  
2859  
2861     APEX_DETAILED_STATUS_FILE_PARSER_INVALID_SECURITY_HASH = 0x0040,  
2862  
2869     APEX_DETAILED_STATUS_CARD_UNFIT_FOR_USE = 0x0041,  
2870  
2872     APEX_DETAILED_STATUS_REQUIRED_PRODUCT_NOT_FOUND = 0x0042,  
2873  
2875     APEX_DETAILED_STATUS_REQUIRED_PRODUCT_NOT_VALID_TEMPORALLY = 0x0043  
2876  
2878     APEX_DETAILED_STATUS_REQUIRED_PRODUCT_DEPENDENCY_FOUND = 0x0044,  
2879  
2881     APEX_DETAILED_STATUS_INVALID_LINE = 0x0045,  
2882  
2884     APEX_DETAILED_STATUS_INVALID_PATTERN = 0x0046,  
2885  
2887     APEX_DETAILED_STATUS_INVALID_STOP = 0x0047,  
2888  
2890     APEX_DETAILED_STATUS_MAX_VALUE = 0x0048  
2891  
2892 } ApexDetailedStatus;  
2893  
2894  
2900 typedef enum  
2901 {
```

```
2903     APEX_LOW_LEVEL_ERROR_TYPE_NONE = 0x00,
2904
2915     APEX_LOW_LEVEL_ERROR_TYPE_CONFIG_FILE_PARSER = 0x01,
2916
2926     APEX_LOW_LEVEL_ERROR_TYPE_APIVIVA = 0x02,
2927
2929     APEX_LOW_LEVEL_ERROR_TYPE_MAX_VALUE = 0x03
2930
2931 } ApexLowLevelErrorType;
2932
2933
2934
2935
2943 typedef struct
2944 {
2950     ApexLowLevelErrorType errorType;
2951
2957     T_U32 status1;
2958
2964     T_U32 status2;
2965
2966 } ApexLowLevelError;
2967
2973 typedef struct
2974 {
2980     ApexStatus apexStatus;
2981
2987     ApexDetailedStatus apexDetailedStatus;
2988
2994     ApexLowLevelError lowLevelError;
2995
2996 } ApexLastError;
2997
2998
2999
3004 typedef enum
3005 {
3007     APEX_TEMPORAL_VALIDITY_START_TYPE_FIRST_DAY_OF_MONTH = 0x00,
3008
3010     APEX_TEMPORAL_VALIDITY_START_TYPE_FIRST_DAY_OF_YEAR = 0x01,
3011
3013     APEX_TEMPORAL_VALIDITY_START_TYPE_CUSTOMER_DEFINED = 0x02,
3014
3016     APEX_TEMPORAL_VALIDITY_START_TYPE_FIRST_VALIDATION = 0x03,
3017
3019     APEX_TEMPORAL_VALIDITY_START_TYPE_PURCHASE_DATE = 0x04,
3020
3022     APEX_TEMPORAL_VALIDITY_START_TYPE_MAX_VALUE = 0x05
3023
3024 } ApexTemporalValidityStartType;
3025
3026
3031 typedef enum
3032 {
```

```
3034     APEX_OPERATION_TYPE_READ = 0x00,
3035
3037     APEX_OPERATION_TYPE_SALE = 0x01,
3038
3040     APEX_OPERATION_TYPE_LOAD = 0x02,
3041
3043     APEX_OPERATION_TYPE_RELOAD = 0x03,
3044
3046     APEX_OPERATION_TYPE_TRANSFER = 0x04,
3047
3049     APEX_OPERATION_TYPE_PERSONALIZATION = 0x05,
3050
3052     APEX_OPERATION_TYPE_INVALIDATION = 0x06,
3053
3055     APEX_OPERATION_TYPE_REHABILITATION = 0x07,
3056
3058     APEX_OPERATION_TYPE_VALIDATION = 0x08,
3059
3061     APEX_OPERATION_TYPE_CONTROL = 0x09,
3062
3064     APEX_OPERATION_TYPE_REMOVE = 0x0A,
3065
3067     APEX_OPERATION_TYPE_PRE_SELECTION = 0x0B,
3068
3070     APEX_OPERATION_TYPE_UNDO = 0x0C,
3071
3073     APEX_OPERATION_TYPE_TRIP_REFUND = 0x0D,
3074
3076     APEX_OPERATION_TYPE_CANCEL = 0x0E,
3077
3079     APEX_OPERATION_TYPE_MAX_VALUE = 0x0F
3080
3081 } ApexOperationType;
3082
3083
3088 typedef enum
3089 {
3091     APEX_UTILIZATION_MODE_TRANSPORT_ENTRANCE = 0x00,
3092
3094     APEX_UTILIZATION_MODE_TRANSPORT_EXIT = 0x01,
3095
3097     APEX_UTILIZATION_MODE_PARKING = 0x02,
3098
3100     APEX_UTILIZATION_MODE_PARKING_METER = 0x03,
3101
3103     APEX_UTILIZATION_MODE_SPECIAL_CHANNEL = 0x04,
3104
3106     APEX_UTILIZATION_MODE_MAX_VALUE = 0x05
3107
3108 } ApexUtilizationMode;
3109
3110
3115 typedef enum
3116 {
```

```
3125     APEX_CONFIGURATION_MODE_OPERATOR = 0x00,  
3126  
3138     APEX_CONFIGURATION_MODE_FULL = 0x01,  
3139  
3141     APEX_CONFIGURATION_MODE_MAX_VALUE = 0x02  
3142  
3143 } ApexConfigurationMode;  
3144  
3145  
3150 typedef struct  
3151 {  
3153     T_S8 operatorId[K_APEX_OPERATOR_ID_MAX_SIZE];  
3154  
3156     T_U16 machineCode;  
3157  
3159     T_S8 channelId[K_APEX_CHANNEL_ID_MAX_SIZE];  
3160  
3162     T_S8 deviceId[K_APEX_DEVICE_ID_MAX_SIZE];  
3163  
3165     ApexUtilizationMode utilizationMode;  
3166  
3168     T_S8 numDailyFilePath[K_APEX_FILE_PATH_MAX_SIZE];  
3169  
3171     T_U16 numDailyMinValue;  
3172  
3174     T_U16 numDailyMaxValue;  
3175  
3176 } ApexOperatorConfig;  
3177  
3178  
3183 typedef struct  
3184 {  
3186     T_S8 operatorId[K_APEX_OPERATOR_ID_MAX_SIZE];  
3187  
3189     T_U16 machineCode;  
3190  
3192     T_S8 channelId[K_APEX_CHANNEL_ID_MAX_SIZE];  
3193  
3195     T_S8 deviceId[K_APEX_DEVICE_ID_MAX_SIZE];  
3196  
3198     ApexUtilizationMode utilizationMode;  
3199  
3201     T_S8 numDailyFilePath[K_APEX_FILE_PATH_MAX_SIZE];  
3202  
3204     T_U16 numDailyMinValue;  
3205  
3207     T_U16 numDailyMaxValue;  
3208  
3210     T_S8 techParamsFullFilename[K_APEX_FILE_PATH_MAX_SIZE];  
3211  
3213     T_S8 networkFullFilename[K_APEX_FILE_PATH_MAX_SIZE];  
3214  
3216     T_S8 comOfferFullFilename[K_APEX_FILE_PATH_MAX_SIZE];  
3217
```

```

3219     T_S8 actionListsFullFilename[K_APEX_FILE_PATH_MAX_SIZE];
3220
3221 } ApexInitParameters;
3222
3223 typedef struct
3224 {
3225     T_S8 operatorId[K_APEX_OPERATOR_ID_MAX_SIZE];
3226
3227     T_S8 channelId[K_APEX_CHANNEL_ID_MAX_SIZE];
3228
3229     T_S8 techParamsFullFilename[K_APEX_FILE_PATH_MAX_SIZE];
3230
3231     T_S8 networkFullFilename[K_APEX_FILE_PATH_MAX_SIZE];
3232
3233     T_S8 comOfferFullFilename[K_APEX_FILE_PATH_MAX_SIZE];
3234
3235     T_S8 actionListsFullFilename[K_APEX_FILE_PATH_MAX_SIZE];
3236
3237 } ApexCheckConfigFilesInputParameters;
3238
3239 typedef struct
3240 {
3241     T_CardPhysicalType cardPhysicalType;
3242
3243     T_U64 cardSerialNumber;
3244
3245     T_CardValidityState cardValidityState;
3246
3247     T_CardFamily cardFamily;
3248
3249     T_U8 cardInfo[K_APEX_SELECT_APP_INFO_MAX_SIZE];
3250
3251     T_U16 cardInfoLength;
3252
3253     T_U8 kvc;
3254
3255 } ApexCardDetectedInfo;
3256
3257 typedef struct
3258 {
3259     T_U16 binaryDataSize;
3260
3261     T_U8 binaryData[K_APEX_BINARY_MAX_SIZE];
3262
3263 } ApexBinary;
3264
3265 typedef struct
3266 {
3267     ApexBinary environmentBinary;
3268
3269     ApexBinary holderIdBinary;
3270
3271     ApexBinary eventBinary;
3272
3273 }
```

```
3322     T_U16 maxContractBinaries;
3323
3325     ApexBinary contractBinariesArray[K_APEX_CONTRACTS_MAX_SIZE];
3326
3328     T_U16 maxLoyaltyBinaries;
3329
3331     ApexBinary loyaltyBinariesArray[K_APEX_LOYALTY_RECORDS_MAX_SIZE];
3332
3334     ApexBinary parkBinary;
3335
3336 } ApexCardBinaries;
3337
3344 typedef struct
3345 {
3362     T_U16 level;
3363
3365     T_S8 description[K_APEX_PRODUCT_CATEGORY_DESCRIPTION_MAX_SIZE];
3366
3367 } ApexProductCategory;
3368
3373 typedef struct
3374 {
3376     T_S8 id[K_APEX_CARD_TYPE_ID_MAX_SIZE];
3377
3378 } ApexCardTypeId;
3379
3380
3385 typedef struct {
3386
3388     T_U16 profilesCount;
3389
3391     ApexProfile* profilesArray;
3392
3393 } ApexProfileCombination;
3394
3395
3400 typedef struct
3401 {
3403     T_S8 salesPackageId[K_APEX_SALES_PACKAGE_ID_MAX_SIZE];
3404
3406     T_U8 groupDimension;
3407
3409     T_U16 unitsNumber;
3410
3412     T_S32 price;
3413
3415     T_S32 taxPercentage;
3416
3418     T_S32 taxValue;
3419
3420 } ApexProductSalesPackage;
3421
3426 typedef struct
3427 {
```

```

3429     T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE];
3430
3432     T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE];
3433
3435     T_U16 productCategoriesCount;
3436
3438     ApexProductCategory* productCategoriesArray;
3439
3441     T_U16 cardTypeIdsCount;
3442
3444     ApexCardTypeId* cardTypeIdsArray;
3445
3447     T_U16 profileCombinationsCount;
3448
3455     ApexProfileCombination* profileCombinationsArray;
3456
3458     T_U16 salesPackagesCount;
3459
3461     ApexProductSalesPackage* salesPackagesArray;
3462
3464     ApexMaterializationType materializationType;
3465
3492     T_U8 operationsAllowed[APEX_OPERATION_TYPE_MAX_VALUE];
3493
3495     T_VivaContractRightExtensionType rightExtensionType;
3496
3498     T_U8 groupFlag;
3499
3500 } ApexCatalogProduct;
3501
3502
3507 typedef struct
3508 {
3510     T_S8 zoneId[K_APEX_ZONE_ID_MAX_SIZE];
3511
3513     T_U8 isSelectedFlag;
3514
3516     T_S8 zoneName[K_APEX_ZONE_NAME_MAX_SIZE];
3517
3518 } ApexProductZoneChoice;
3519
3520
3525 typedef struct
3526 {
3528     T_S8 spatialValidityId[K_APEX_GENERIC_ID_MAX_SIZE];
3529
3531     T_U8 isSelectedFlag;
3532
3534     T_S8 lineName[K_APEX_LINE_NAME_MAX_SIZE];
3535
3537     T_S8 originZoneName[K_APEX_ZONE_NAME_MAX_SIZE];
3538
3540     T_S8 destinationZoneName[K_APEX_ZONE_NAME_MAX_SIZE];
3541

```

```
3543     T_S8 viaZoneName[K_APEX_ZONE_NAME_MAX_SIZE];
3544
3545 } ApexProductSpatialValidityChoice;
3546
3547
3552 typedef struct
3553 {
3555     T_S8 salesPackageId[K_APEX_SALES_PACKAGE_ID_MAX_SIZE];
3556
3558     T_U8 isSelectedFlag;
3559
3561     T_U8 groupDimension;
3562
3564     T_U16 unitsNumber;
3565
3567     T_S32 price;
3568
3570     T_S32 taxPercentage;
3571
3573     T_S32 taxValue;
3574
3575 } ApexProductSalesPackageChoice;
3576
3577
3582 typedef struct
3583 {
3585     ApexProductParamType type;
3586
3588     T_U32 numValue;
3589
3595     T_U64 numValue64;
3596
3598     T_UtilDateTime dateTimeValue;
3599
3601     T_S8 textViewe[K_APEX_PRODUCT_PARAM_TEXT_VALUE_MAX_SIZE];
3602
3610     T_S8 configId[K_APEX_GENERIC_ID_MAX_SIZE];
3611
3613     T_U16 zoneChoiceNumberOfSelections;
3614
3616     T_U16 zoneChoiceCount;
3617
3619     ApexProductZoneChoice* zoneChoiceArray;
3620
3622     T_U16 spatialValidityChoiceCount;
3623
3625     ApexProductSpatialValidityChoice* spatialValidityChoiceArray;
3626
3628     T_U16 salesPackageChoiceCount;
3629
3631     ApexProductSalesPackageChoice* salesPackageChoiceArray;
3632
3633 } ApexProductParameter;
3634
```

```

3639 typedef struct
3640 {
3642     T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE];
3643
3645     T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE];
3646
3648     T_S8 salesPackageId[K_APEX_SALES_PACKAGE_ID_MAX_SIZE];
3649
3651     T_S32 price;
3652
3654     T_S32 taxPercentage;
3655
3657     T_S32 taxValue;
3658
3659 } ApexPhysicalSupport;
3660
3665 typedef struct
3666 {
3668     T_S8 configurationId[K_APEX_CONFIGURATION_ID_MAX_SIZE];
3669
3671     ApexConfigureProductStatus status;
3672
3679     T_S32 price;
3680
3682     T_U8 parameterCount;
3683
3685     ApexProductParameter* parameterArray;
3686
3688     T_U8 hasPhysicalSupport;
3689
3691     ApexPhysicalSupport physicalSupport;
3692
3693 } ApexProductConfiguration;
3694
3699 typedef enum
3700 {
3702     APEX_CONTROL_TYPE_UNDEFINED = 0x00,
3703
3705     APEX_CONTROL_TYPE_CONTRACT = 0x01,
3706
3708     APEX_CONTROL_TYPE_WHITELIST = 0x02,
3709
3711     APEX_CONTROL_TYPE_MAX_VALUE = 0x03
3712
3713 } ApexControlType;
3714
3719 typedef enum
3720 {
3726     APEX_CONTROL_WHITELIST_STATUS_UNKNOWN = 0x00,
3727
3729     APEX_CONTROL_WHITELIST_STATUS_VALID = 0x01,
3730
3732     APEX_CONTROL_WHITELIST_STATUS_INVALID = 0x02,
3733

```

```

3740     APEX_CONTROL_WHITELIST_STATUS_MAYBE_VALID = 0x03,
3741
3743     APEX_CONTROL_WHITELIST_STATUS_VALID_BUT_NOT_VALIDATED = 0x04,
3744
3746     APEX_CONTROL_WHITELIST_STATUS_MAYBE_VALID_BUT_NOT_VALIDATED = 0x05
3747
3749     APEX_CONTROL_WHITELIST_STATUS_MAX_VALUE = 0x06
3750
3751 } ApexControlWhitelistStatus;
3752
3757 typedef enum
3758 {
3760     APEX_CONTROL_STATUS_UNDETERMINED = 0x00,
3761
3763     APEX_CONTROL_STATUS_VALID = 0x01,
3764
3766     APEX_CONTROL_STATUS_INVALID = 0x02,
3767
3769     APEX_CONTROL_STATUS_MAYBE_VALID = 0x03,
3770
3772     APEX_CONTROL_STATUS_MAX_VALUE = 0x04
3773
3774 } ApexControlStatus;
3775
3783 typedef struct
3784 {
3786     T_S8 transactionId[K_APEX_TRANSACTION_ID_MAX_SIZE];
3787
3789     ApexCardInfo cardInfo;
3790
3792     ApexCardData cardData;
3793
3795     ApexControlEnvironmentStatus environmentStatus;
3796
3798     T_U16 contractStatusCount;
3799
3805     ApexControlContractStatus contractStatusArray[K_APEX_CONTRACTS_MAX_
3806
3814     T_U8 contractsInGreenlistFlag;
3815
3817     ApexControlWhitelistStatus whitelistStatus;
3818
3820     ApexControlStatus controlStatus;
3821
3822 } ApexControlOutputData;
3823
3828 typedef struct
3829 {
3831     T_S8 id[K_APEX_INFRACTION_ID_MAX_SIZE];
3832
3834     T_S8 description[K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE];
3835
3837     T_U16 infractionAttributesCount;
3838

```

```
3840     ApexInfractionAttribute* infractionAttributesArray;
3841
3847     T_U8 contractStatusMask[APEX_CONTROL_CONTRACT_STATUS_MAX_VALUE];
3848
3854     T_U8 environmentStatusMask[APEX_CONTROL_ENVIRONMENT_STATUS_MAX_VALUE];
3855
3857     T_S8 procedure[K_APEX_INFRACTION_PROCEDURE_MAX_SIZE];
3858
3859 } ApexInfraction;
3860
3861
3866 typedef struct
3867 {
3869     T_S8 id[K_APEX_FINE_ID_MAX_SIZE];
3870
3872     T_S8 description[K_APEX_FINE_DESCRIPTION_MAX_SIZE];
3873
3875     T_U16 fineAttributesCount;
3876
3878     ApexFineAttribute* fineAttributesArray;
3879
3881     T_U16 infractionsCount;
3882
3884     ApexInfraction* infractionsArray;
3885
3887     T_S32 minAmount;
3888
3890     T_S32 maxAmount;
3891
3893     T_S32 promptAmount;
3894
3895 } ApexFine;
3896
3900 typedef struct {
3901
3903     T_S8 stopId[K_APEX_STOP_ID_MAX_SIZE];
3904
3906     T_S8 stopName[K_APEX_STOP_NAME_MAX_SIZE];
3907
3908 } ApexStopInfo;
3909
3913 typedef struct {
3914
3916     T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE];
3917
3919     T_S8 patternName[K_APEX_PATTERN_NAME_MAX_SIZE];
3920
3922     T_U16 stopInfoCount;
3923
3925     ApexStopInfo* stopInfoArray;
3926
3927 } ApexPatternInfo;
3928
3932 typedef struct {
```

```
3933  
3935     T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE];  
3936  
3938     T_S8 lineName[K_APEX_LINE_NAME_MAX_SIZE];  
3939  
3941     T_U16 patternInfoCount;  
3942  
3944     ApexPatternInfo* patternInfoArray;  
3945  
3946 } ApexLineInfo;  
3947  
3955 typedef struct  
3956 {  
3958     T_U16 lineInfoCount;  
3959  
3961     ApexLineInfo* lineInfoArray;  
3962  
3963 } ApexLinesInfo;  
3964  
3969 typedef struct {  
3970  
3977     T_S8 infractionAttributeId[K_APEX_INFRACTION_ATTRIBUTE_ID_MAX_SIZE]  
3978  
3985     ApexControlEnvironmentStatus environmentStatus;  
3986  
3993     ApexControlContractStatus contractStatus;  
3994  
3995 } ApexGetInfractionsInputParameters;  
3996  
4001 typedef struct  
4002 {  
4004     T_S8 infractionNumber[K_APEX_INFRACTION_NUMBER_MAX_SIZE];  
4005  
4007     T_S8 fineOperatorId[K_APEX_OPERATOR_ID_MAX_SIZE];  
4008  
4010     T_S8 offenderName[K_APEX_OFFENDER_NAME_MAX_SIZE];  
4011  
4013     T_UtilDate offenderBirthDate;  
4014  
4016     T_S8 offenderAddress[K_APEX_OFFENDER_ADDRESS_MAX_SIZE];  
4017  
4019     T_S8 offenderPostalCode[K_APEX_OFFENDER_POSTAL_CODE_MAX_SIZE];  
4020  
4022     ApexDocumentType offenderDocumentType;  
4023  
4025     T_S8 offenderIdentityNumber[K_APEX_IDENTITY_NUMBER_MAX_SIZE];  
4026  
4028     T_S8 offenderVatNumber[K_APEX_VAT_NUMBER_MAX_SIZE];  
4029  
4031     T_S8 infractionDescription[K_APEX_INFRACTION_DESCRIPTION_MAX_SIZE];  
4032  
4034     T_S8 infractionPlace[K_APEX_INFRACTION_PLACE_MAX_SIZE];  
4035  
4037     T_UtilDateTime infractionDate;
```

```
4038
4040     T_UtilDateTime infractionNoticeDate;
4041
4043     ApexDocumentType controllerDocumentType;
4044
4046     T_S8 controllerIdentityNumber[K_APEX_IDENTITY_NUMBER_MAX_SIZE];
4047
4049     ApexDocumentType witnessDocumentType;
4050
4052     T_S8 witnessIdentityNumber[K_APEX_IDENTITY_NUMBER_MAX_SIZE];
4053
4055     T_S8 infractionId[K_APEX_INFRACTION_ID_MAX_SIZE];
4056
4058     T_S8 fineId[K_APEX_FINE_ID_MAX_SIZE];
4059
4061     T_S8 attachedDocumentName[K_APEX_DOCUMENT_NAME_MAX_SIZE];
4062
4064     ApexDocumentType attachedDocumentType;
4065
4067     T_S8 attachedDocumentObs[K_APEX_DOCUMENT_OBS_MAX_SIZE];
4068
4070     T_S32 fineAmount;
4071
4072 } ApexControlFine;
4073
4080 typedef struct
4081 {
4083     T_S8 cardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE];
4084
4086     T_U8 cardIssuer;
4087
4089     T_U32 cardNumber;
4090
4092     T_U64 cardSerialNumber;
4093
4094 } ApexDamagedCardInfo;
4095
4100 typedef struct {
4101
4108     T_S8 fineAttributeId[K_APEX_FINE_ATTRIBUTE_ID_MAX_SIZE];
4109
4116     T_S8 infractionId[K_APEX_INFRACTION_ID_MAX_SIZE];
4117
4118 } ApexGetFinesInputParameters;
4119
4124 typedef struct {
4125
4132     T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE];
4133
4140     T_S8 patternId[K_APEX_LINE_ID_MAX_SIZE];
4141
4143     T_U8 includePatternsFlag;
4144
4151     T_U8 includeStopsFlag;
```

```
4152 } ApexGetLinesInputParameters;
4153
4154
4155 typedef struct
4156 {
4157     T_U8 contractNumber;
4158
4159     T_U8 isODPreSelectionFlag;
4160
4161 } ApexConfigurePreSelectionParameters;
4162
4163
4164
4165
4166
4167
4168
4169
4170
4171
4172 typedef struct
4173 {
4174     T_S8 configurationId[K_APEX_CONFIGURATION_ID_MAX_SIZE];
4175
4176     T_U8 isValid;
4177
4178     T_U8 isODPreSelectionFlag;
4179
4180     T_U16 originZoneSelectedIndex;
4181
4182     T_U16 originZonesCount;
4183
4184     ApexZone* originZonesArray;
4185
4186     T_U16 destinationZoneSelectedIndex;
4187
4188     T_U16 destinationZonesCount;
4189
4190     ApexZone* destinationZonesArray;
4191
4192 } ApexPreSelectionConfiguration;
4193
4194
4195
4196
4197
4198
4199
4200
4201
4202
4203 } ApexPreSelectionConfiguration;
4204
4205
4206
4207
4208
4209 typedef struct
4210 {
4211     T_U8 cardFilterFlag;
4212
4213     T_U8 cacheOptimizationFlag;
4214
4215     T_U8 locationFilterFlag;
4216
4217 } ApexGetCatalogParameters;
4218
4219
4220
4221
4222
4223
4224
4225
4226
4227
4228
4229
4230
4231
4232
4233
4234
4235 } ApexGetCatalogParameters;
4236
4237
4238
4239
4240
4241
4242
4243
4244
4245
4246
4247 typedef struct
4248 {
4249     ApexConfigureProductMode configureMode;
4250
4251     T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE];
4252
4253     ApexBinary contractBinary;
4254
4255     T_S8 cardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE];
4256
4257 }
```

```

4307     T_U8 cacheOptimizationFlag;
4308
4309 } ApexConfigureProductParameters;
4310
4315 typedef struct
4316 {
4318     ApexPaymentMethod paymentMethod;
4319
4321     T_S8 vatNumber[K_APEX_VAT_NUMBER_MAX_SIZE];
4322
4324     T_S8 invoiceNumber[K_APEX_INVOICE_NUMBER_MAX_SIZE];
4325
4326 } ApexPaymentInfo;
4327
4332 typedef struct
4333 {
4339     T_U8 profileValidationFlag;
4340
4342     T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE];
4343
4345     T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE];
4346
4348     T_U32 unitsToDebit;
4349
4351     T_U16 profilesCount;
4352
4354     ApexCardProfile profilesArray[K_APEX_PROFILES_MAX_SIZE];
4355
4357     T_VivaEventType eventType;
4358
4359 } ApexConfirmValidationInfo;
4360
4361
4365 typedef struct
4366 {
4368     T_UtilDateTime initialDateTime;
4369
4371     T_UtilDateTime finalDateTime;
4372
4373 } ApexTripDuration;
4374
4379 typedef struct
4380 {
4388     ApexValidationStatus validationStatus;
4389
4391     T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE];
4392
4394     T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE];
4395
4397     T_U8 productHasExpirationDate;
4398
4400     T_UtilDateTime productExpirationDate;
4401
4403     ApexUnitType unitType;

```

```
4404
4406     T_U32 decrementedUnits;
4407
4409     T_U32 remainingUnits;
4410
4412     T_U16 profilesCount;
4413
4415     ApexCardProfile profilesArray[K_APEX_PROFILES_MAX_SIZE];
4416
4418     ApexTripDuration tripDuration;
4419
4420 } ApexValidationInfo;
4421
4422
4423 typedef struct
4424 {
4425     T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE];
4426
4427     T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE];
4428
4429     T_UtilDate saleDate;
4430
4431     T_UtilDate validityStartDate;
4432
4433     T_UtilDate validityEndDate;
4434
4435     ApexUnitType unitType;
4436
4437     T_U32 units;
4438
4439 } ApexConfirmTransferInfo;
4440
4441
4442
4443
4444
4445
4446
4447 typedef struct
4448 {
4449     T_S8 productId[K_APEX_PRODUCT_ID_MAX_SIZE];
4450
4451     T_S8 productName[K_APEX_PRODUCT_NAME_MAX_SIZE];
4452
4453     T_UtilDate saleDate;
4454
4455     T_UtilDate validityStartDate;
4456
4457     T_UtilDate validityEndDate;
4458
4459     ApexContractDurationType temporalUnitsType;
4460
4461     T_U32 temporalUnits;
4462
4463     ApexUnitType unitType;
4464
4465     T_U32 units;
4466
4467     T_S32 price;
```

```
4488
4489     T_S32 dailyUsageValue;
4490
4491 } ApexConfirmCancelInfo;
4492
4493
4494
4495 typedef struct
4496 {
4497     T_S8 ticketNumber[K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE];
4498
4499     T_UtilDateTime saleDate;
4500
4501     T_UtilDateTime expirationDate;
4502
4503     T_S32 price;
4504
4505     T_S32 taxPercentage;
4506
4507     T_S8 operatorName[K_APEX_OPERATOR_NAME_MAX_SIZE];
4508
4509     T_S8 operatorShortName[K_APEX_OPERATOR_SHORT_NAME_MAX_SIZE];
4510
4511     T_S8 lineName[K_APEX_LINE_NAME_MAX_SIZE];
4512
4513     T_S8 patternName[K_APEX_PATTERN_NAME_MAX_SIZE];
4514
4515     T_S8 stopName[K_APEX_STOP_NAME_MAX_SIZE];
4516
4517     T_S8 securityData[K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE];
4518
4519 } ApexPaperTicketData;
4520
4521
4522
4523 typedef struct {
4524
4525     T_S8 cardBlacklistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE];
4526
4527     T_S8 cardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE];
4528
4529     T_U64 cardSerialNumber;
4530
4531 } ApexBlacklistCardElement;
4532
4533
4534
4535 typedef struct {
4536
4537     T_S8 samBlacklistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE];
4538
4539     T_S8 samTypeId[K_APEX_SAM_TYPE_ID_MAX_SIZE];
4540
4541     T_U64 samSerialNumber;
4542
4543     T_U8 hasStartDate;
4544
4545     T_UtilDateTime startDate;
4546 }
```

```

4586     T_U8 hasEndDate;
4587
4589     T_UtilDateTime endDate;
4590
4591 } ApexBlacklistSamElement;
4592
4597 typedef struct {
4598
4600     T_S8 greylistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE];
4601
4603     T_S8 cardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE];
4604
4606     T_U64 cardSerialNumber;
4607
4609     T_S8 productLongId[K_APEX_PRODUCT_ID_MAX_SIZE];
4610
4612     T_U8 hasMachineCode;
4613
4615     T_U16 machineCode;
4616
4618     T_U8 hasLoadDate;
4619
4621     T_UtilDate loadDate;
4622
4624     T_U8 hasLoadSequenceNumber;
4625
4627     T_U16 loadSequenceNumber;
4628
4630     T_U8 hasCardDataModel;
4631
4633     T_CardDataModel cardDataModel;
4634
4635 } ApexGreylistElement;
4636
4641 typedef struct
4642 {
4644     T_S8 spatialValidityId[K_APEX_SPATIAL_VALIDITY_ID_MAX_SIZE];
4645
4647     T_S8 matrixElementId[K_APEX_PRODUCT_MATRIX_ELEMENT_ID_MAX_SIZE];
4648
4650     T_U32 zonesCount;
4651
4653     T_S8 zoneIdArray[K_APEX_MAX_AVAILABLE_ZONES_COUNT][K_APEX_ZONE_ID_MAX_SIZE];
4654
4655 } ApexSpatialValidityData;
4656
4661 typedef struct {
4662
4664     T_S8 whitelistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE];
4665
4667     T_S8 productLongId[K_APEX_PRODUCT_ID_MAX_SIZE];
4668
4670     T_U32 spatialValiditiesCount;
4671

```

```
4678     ApexSpatialValidityData* spatialValiditiesArray;
4679
4681     T_UtilDateTime startDate;
4682
4684     T_U8 hasEndDate;
4685
4687     T_UtilDateTime endDate;
4688
4690     ApexAntipassbackMode antipassbackMode;
4691
4693     T_U16 usedProfilesCount;
4694
4696     T_S8 usedProfilesIdArray[K_APEX_PROFILES_MAX_SIZE][K_APEX_PROFILE_ID_MAX_SIZE];
4697
4698 } ApexWhitelistProfileElement;
4699
4704 typedef struct {
4705
4707     T_S8 whitelistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE];
4708
4710     T_S8 cardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE];
4711
4713     T_U64 cardSerialNumber;
4714
4716     T_S8 productLongId[K_APEX_PRODUCT_ID_MAX_SIZE];
4717
4719     T_U32 spatialValiditiesCount;
4720
4727     ApexSpatialValidityData* spatialValiditiesArray;
4728
4730     T_UtilDateTime startDate;
4731
4733     T_U8 hasEndDate;
4734
4736     T_UtilDateTime endDate;
4737
4739     ApexAntipassbackMode antipassbackMode;
4740
4741 } ApexWhitelistCardElement;
4742
4747 typedef struct {
4748
4750     T_S8 greenlistItemId[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE];
4751
4753     T_S8 cardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE];
4754
4756     T_U64 cardSerialNumber;
4757
4759     T_S8 productLongId[K_APEX_PRODUCT_ID_MAX_SIZE];
4760
4762     T_S8 authorizationId[K_APEX_ACTION_LISTS_AUTHORIZATION_ID_MAX_SIZE];
4763
4765     T_S8 salesPackageId[K_APEX_SALES_PACKAGE_ID_MAX_SIZE];
4766
```

```

4768     T_U32 spatialValiditiesCount;
4769
4776     ApexSpatialValidityData* spatialValiditiesArray;
4777
4779     T_UtilDateTime contractStartDate;
4780
4787     T_U8 onlineCheckFlag;
4788
4790     T_S8 personalizationId[K_APEX_PERSONALIZATION_ID_MAX_SIZE];
4791
4792 } ApexGreenlistElement;
4793
4794 /* -----
4795 * - API-APEX callbacks functions prototype -----
4796 * - External Interface to Callbacks -----
4797 * -----
4798 */
4799
4830     typedef ApexCallbackStatus (CALLBACK* F_CB_TransactionReport)(void*
4831         inCallbackContext, ApexTransactionType inTransactionType, T_U16
4832         inTransactionSize, T_S8* inTransaction);
4833
4834
4857     typedef ApexCallbackStatus (CALLBACK* F_CB_ConfirmValidation)(void*
4858         inCallbackContext, ApexCardInfo* inCardInfo, ApexConfirmValidationInfo*
4859         inValidationInfo);
4860
4861
4884     typedef ApexCallbackStatus (CALLBACK* F_CB_PostValidation)(void*
4885         inCallbackContext, ApexCardInfo* inCardInfo, ApexValidationInfo* inValida
4886
4887
4911     typedef ApexCallbackStatus (CALLBACK* F_CB_ConfirmTransfer)(void*
4912         inCallbackContext, ApexCardInfo* inCardInfo, ApexConfirmTransferInfo* inT
4913
4914
4937     typedef ApexCallbackStatus (CALLBACK* F_CB_ConfirmCancel)(void*
4938         inCallbackContext, ApexCardInfo* inCardInfo, ApexConfirmCancelInfo* inCan
4939
4940
4965     typedef ApexCallbackStatus (CALLBACK* F_CB_GetLoadSequenceId)(void*
4966         inCallbackContext, T_U32 inMachineCode, T_CardDataModel
4967         inCardDataModel, T_U16* outNumDaily);
4968
4969
5009     typedef ApexCallbackStatus (CALLBACK* F_CB_WebService)(void*
5010         inCallbackContext, const T_S8* inURL, const T_S8* inHttpHeaders, const
          T_S8* inBodyContent, T_U32* inOutResponseLength, T_S8* outResponse,
          T_U16* outHttpStatus);

```

```

5046 | typedef ApexCallbackStatus (CALLBACK* F_CB_CheckBlacklistCard) (void*
5047 |   inCallbackContext, T_S8 inCardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE],
5048 |   T_U64* inCardSerialNumber, T_U8* outElementExists,
5049 |   ApexBlacklistCardElement* outBlacklistCardElement);
5047 |
5080 | typedef ApexCallbackStatus (CALLBACK* F_CB_CheckBlacklistSam) (void*
5081 |   inCallbackContext, T_U64* inSamSerialNumber, T_U8* outElementExists,
5082 |   ApexBlacklistSamElement* outBlacklistSamElement);
5081 |
5129 | typedef ApexCallbackStatus (CALLBACK* F_CB_CheckGreylist) (void*
5130 |   inCallbackContext, T_S8 inCardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE],
5131 |   T_U64* inCardSerialNumber,
5130 |   T_S8 inProductLongId[K_APEX_PRODUCT_ID_MAX_SIZE], T_U32
5131 |   inMachineCode, T_UtilDateTime* inLoadDate, T_U32 inLoadSequenceNumber,
5132 |   T_U8* outElementExists, ApexGreylistElement* outGreylistElement);
5131 |
5179 | typedef ApexCallbackStatus (CALLBACK* F_CB_CheckWhitelistProfile)
5180 |   (void* inCallbackContext, T_S8
5181 |   inLastWhitelistItemID[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE], T_U16
5180 |   inProfileIdsCount, T_S8 inProfileIdsArray[K_APEX_PROFILES_MAX_SIZE][K_APE
5181 |   T_UtilDateTime* inTransactionDateTime, T_S8
5182 |   inOperatorLongId[K_APEX_OPERATOR_ID_MAX_SIZE], T_U8* outElementExists,
5183 |   T_U8* outHasNext, ApexWhitelistProfileElement* outWhitelistProfileElement
5181 |
5226 | typedef ApexCallbackStatus (CALLBACK* F_CB_CheckWhitelistCard) (void*
5227 |   inCallbackContext, T_S8
5228 |   inLastWhitelistItemID[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE], T_S8 inCardI
5227 |   T_U64* inCardSerialNumber, T_UtilDateTime* inTransactionDateTime,
5228 |   T_U8* outElementExists, T_U8* outHasNext, ApexWhitelistCardElement* outWh
5228 |
5273 | typedef ApexCallbackStatus (CALLBACK* F_CB_CheckGreenlist) (void*
5274 |   inCallbackContext, T_S8
5275 |   inLastGreenlistItemID[K_APEX_ACTION_LISTS_ITEM_ID_MAX_SIZE], T_S8 inCardI
5274 |   T_U64* inCardSerialNumber, T_UtilDateTime* inTransactionDateTime,
5275 |   T_U8* outElementExists, T_U8* outHasNext, ApexGreenlistElement* outGreenl
5275 |
5276 | #ifdef __cplusplus
5277 | }
5278 | #endif /* __cplusplus */
5279 |
5280 | #endif /* __APEX_GLB_H */

```

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apex.h

Go to the documentation of this file.

```
1
29 #ifndef __API_APEX_H
30 #define __API_APEX_H
31
32
33 /* -----
34 * - Includes -----
35 * -----
36 #include "apexGlb.h"
37 #include "apexLog.h"
38
39 #ifdef __cplusplus
40 extern "C" {
41 #endif /* __cplusplus */
42
43
44 /* -----
45 * - Defines -----
46 * -----
47
53 #define K_APEX_MAX_CARD_READERS
54
59 #define K_APEX_MAX_SAM_READERS
60
61
62 /* -----
63 * - Type Definitions -----
64 * -----
65
70 typedef struct
71 {
80     T_S8 apiApexVersion[K_APEX_LIBRARY_VERSION_MAX_SIZE];
81
91     T_S8 apiVivaVersion[K_APEX_LIBRARY_VERSION_MAX_SIZE];
92 }
```

```
93 } ApexVersion;
94
95
100 typedef struct
101 {
107     T_U8 cardReaderId;
108
114     T_U8 samReaderId;
115
117     T_WorkingMode workingMode;
118
119 } ApexCardSamAssociation;
120
128 typedef struct
129 {
131     ApexCardInfo cardInfo;
132
138     T_U8 cardInBlacklistFlag;
139
145     T_U8 samInBlacklistFlag;
146
154     T_U8 contractsInGreenlistFlag;
155
157     ApexCardData cardData;
158
160     ApexCardDataExtra cardDataExtra;
161
162 } ApexReadCardOutputData;
163
164
172 typedef struct
173 {
185     T_U8 readHolderIdFlag;
186
194     T_U8 readLoyaltyDataFlag;
195
203     T_U8 readParkDataFlag;
204
205 } ApexReadCardInputParameters;
206
207
215 typedef enum
216 {
224     APEX_CONTEXT_PARAM_ID_LOGGER_CONFIG = 0x00,
225
227     // APEX_CONTEXT_PARAM_ID_ACTIONLISTS_RELOAD = 0x01,
228
233     APEX_CONTEXT_PARAM_ID_SERVICE_LOCATION = 0x02,
234
245     APEX_CONTEXT_PARAM_ID_SET_EXTERNAL_CARD = 0x03,
246
255     APEX_CONTEXT_PARAM_ID_SET_CARD_TYPE_ID = 0x04,
256
270     APEX_CONTEXT_PARAM_ID_PERFORMANCE_CONFIG = 0x05,
```

```
271
276     APEX_CONTEXT_PARAM_ID_CONTROL_SERVICE_LOCATION = 0x06,
277
282     APEX_CONTEXT_PARAM_ID_CONFIG_MODE = 0x07,
283
288     APEX_CONTEXT_PARAM_ID_CONFIG_OPERATOR = 0x08,
289
295     APEX_CONTEXT_PARAM_ID_ACCESS_KEY = 0x09,
296
298     APEX_CONTEXT_PARAM_ID_MAX_VALUE = 0x0A
299
300 } ApexContextParamId;
301
302
307 typedef enum
308 {
310     APEX_CALLBACK_ID_UNDEFINED = 0x00,
311
313     APEX_CALLBACK_ID_TRANSACTION_REPORT = 0x01,
314
316     APEX_CALLBACK_ID_CONFIRM_VALIDATION = 0x02,
317
319     APEX_CALLBACK_ID_POST_VALIDATION = 0x03,
320
322     APEX_CALLBACK_ID_CONFIRM_TRANSFER = 0x04,
323
325     APEX_CALLBACK_ID_CONFIRM_CANCEL = 0x05,
326
328     APEX_CALLBACK_ID_LOAD_SEQUENCE = 0x06,
329
331     APEX_CALLBACK_ID_WEB_SERVICE = 0x07,
332
334     APEX_CALLBACK_ID_CHECK_BLACKLIST_CARD = 0x08,
335
337     APEX_CALLBACK_ID_CHECK_BLACKLIST_SAM = 0x09,
338
340     APEX_CALLBACK_ID_CHECK_GREYLIST = 0x0A,
341
343     APEX_CALLBACK_ID_CHECK_WHITELIST_PROFILE = 0x0B,
344
346     APEX_CALLBACK_ID_CHECK_WHITELIST_CARD = 0x0C,
347
349     APEX_CALLBACK_ID_CHECK_GREENLIST = 0x0D,
350
352     APEX_CALLBACK_ID_MAX_VALUE = 0x0E
353
354 } ApexCallbackId;
355
360 typedef enum
361 {
363     APEX_DATA_TYPE_ID_UNDEFINED = 0x00,
364
366     APEX_DATA_TYPE_ID_READ_CARD_OUTPUT_DATA = 0x01,
367 }
```

```

369     APEX_DATA_TYPE_ID_CONTROL_OUTPUT_DATA = 0x02,
370
372     APEX_DATA_TYPE_ID_DECODED_TRANSACTION = 0x03,
373
375     APEX_DATA_TYPE_ID_LINES_INFO = 0x04,
376
378     APEX_DATA_TYPE_ID_MAX_VALUE = 0x05
379
380 } ApexDataTypeId;
381
386 typedef struct
387 {
389     T_S8 operationPlanId[K_APEX_OPERATION_PLAN_ID_MAX_SIZE];
390
392     T_S8 blockId[K_APEX_BLOCK_ID_MAX_SIZE];
393
395     T_U32 vehicleId;
396
398     T_S8 dutyId[K_APEX_DUTY_ID_MAX_SIZE];
399
401     T_S8 journeyId[K_APEX_JOURNEY_ID_MAX_SIZE];
402
404     T_S8 extraJourneyId[K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE];
405
407     T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE];
408
410     T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE];
411
413     T_S8 stopId[K_APEX_STOP_ID_MAX_SIZE];
414
458     ApexOutOfBoundsType outOfBoundsType;
459
460 } ApexServiceLocation;
461
466 typedef struct
467 {
469     T_S8 operationPlanId[K_APEX_OPERATION_PLAN_ID_MAX_SIZE];
470
472     T_S8 blockId[K_APEX_BLOCK_ID_MAX_SIZE];
473
475     T_U32 vehicleId;
476
478     T_S8 dutyId[K_APEX_DUTY_ID_MAX_SIZE];
479
481     T_S8 journeyId[K_APEX_JOURNEY_ID_MAX_SIZE];
482
484     T_S8 extraJourneyId[K_APEX_EXTRA_JOURNEY_ID_MAX_SIZE];
485
487     T_S8 lineId[K_APEX_LINE_ID_MAX_SIZE];
488
490     T_S8 patternId[K_APEX_PATTERN_ID_MAX_SIZE];
491
493     T_S8 originStopId[K_APEX_STOP_ID_MAX_SIZE];
494

```

```
501     T_S8 destinationStopId[K_APEX_STOP_ID_MAX_SIZE];
502
503 } ApexControlServiceLocation;
504
509 typedef struct
510 {
511     T_U8 cacheOptimizationFlag;
512
513 } ApexGreenlistLoadParameters;
514
529 typedef struct
530 {
532     T_U32 capacity;
533
535     T_U8 autoIncreaseFlag;
536
538     T_S8 fullFileName[K_APEX_FILE_PATH_MAX_SIZE];
539
540 } ApexPerformanceConfig;
541
546 typedef enum
547 {
557     APEX_TRANSFER_MODE_READ = 0x00,
558
563     APEX_TRANSFER_MODE_LOAD_FROM_CARD = 0x01,
564
572     APEX_TRANSFER_MODE_LOAD_FROM_CATALOG = 0x02,
573
575     APEX_TRANSFER_MODE_MAX_VALUE = 0x03
576
577 } ApexTransferMode;
578
583 typedef struct
584 {
591     T_S8 configurationId[K_APEX_CONFIGURATION_ID_MAX_SIZE];
592
599     T_S8 corrCardTypeId[K_APEX_CARD_TYPE_ID_MAX_SIZE];
600
607     T_U8 corrCardIssuer;
608
615     T_U32 corrCardNumber;
616
623     T_U64 corrCardSerialNumber;
624
625 } ApexCatalogTransferParameters;
626
631 typedef struct
632 {
634     T_U16 contractCount;
635
642     T_U8 contractNumber[K_APEX_CONTRACTS_MAX_SIZE];
643
644 } ApexReadTransferParameters;
645
```

```
650 typedef struct
651 {
653     ApexTransferMode transferMode;
654
656     T_S8 cardTypeID[K_APEX_CARD_TYPE_ID_MAX_SIZE];
657
659     ApexReadTransferParameters readTransferParameters;
660
669     T_U8 contractNumber;
670
672     ApexCatalogTransferParameters catalogTransferParameters;
673
674 } ApexTransferParameters;
675
683 typedef struct
684 {
685
687     T_U16 catalogProductsCount;
688
690     ApexCatalogProduct* catalogProductsArray;
691
692 } ApexCatalog;
693
694
699 typedef struct
700 {
702     T_U8 contractNumber;
703
712     T_U32 productQuantity;
713
715     T_U32 unitsQuantity;
716
724     T_S32 price;
725
731     T_S8 salesPackageID[K_APEX_SALES_PACKAGE_ID_MAX_SIZE];
732
734     T_U8 dailyUsageRateFlag;
735
742     T_U16 usageDays;
743
745     ApexPaymentInfo paymentInfo;
746
747 } ApexCancelParameters;
748
753 typedef enum {
755     APEX_PAPER_SALE_ACK_MODE_TICKET_DATA_READ = 0x00,
756
758     APEX_PAPER_SALE_ACK_MODE_LAST_SALE = 0x01,
759
761     APEX_PAPER_SALE_ACK_MODE_MANUAL_INPUT = 0x02,
762
764     APEX_PAPER_SALE_ACK_MODE_MAX_VALUE = 0x03
765
766 } ApexPaperSaleAckMode;
```

```
767
772 typedef struct
773 {
780     T_S8 ticketNumber[K_APEX_PAPER_TICKET_NUMBER_MAX_SIZE];
781
782     T_S8 securityData[K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE];
789 } ApexPaperSaleAckParameters;
790
791
793
798 typedef enum {
799
801     APEX_PRE_SELECTION_MODE_ON_MEMORY = 0x00,
802
804     APEX_PRE_SELECTION_MODE_ON_CARD = 0x01,
805
807     APEX_PRE_SELECTION_MODE_MAX_VALUE = 0x02
808
809 } ApexPreSelectionMode;
810
811
816 typedef struct
817 {
819     T_S8 configurationId[K_APEX_CONFIGURATION_ID_MAX_SIZE];
820
822     ApexPreSelectionMode preSelectionMode;
823
824 } ApexPreSelectionParameters;
825
826
834 typedef struct
835 {
837     T_U16 infractionAttributesCount;
838
840     ApexInfractionAttribute* infractionAttributesArray;
841
842 } ApexInfractionAttributes;
843
844
852 typedef struct
853 {
856     T_U16 infractionsCount;
857
859     ApexInfraction* infractionsArray;
860
861 } ApexInfractions;
862
863
871 typedef struct
872 {
874     T_U16 fineAttributesCount;
```

```
877     ApexFineAttribute* fineAttributesArray;
878 
879 } ApexFineAttributes;
880 
881 
882 typedef struct
883 {
884     T_U16 finesCount;
885 
886     ApexFine* finesArray;
887 } ApexFines;
888 
889 /* -----
903 -----*/
904 /* - API-APEX functions prototype -----*/
905 /* - External Interface to Ticketing Application -----*/
906 /* -----
907 -----*/
908 
909 EXPORT ApexStatus CALL_CONVENTION Apex(void** outApexContext);
910 
911 
912 EXPORT ApexStatus CALL_CONVENTION ApexDestroy(void** inApexContext);
913 
914 
915 EXPORT ApexStatus CALL_CONVENTION ApexInit(void* inApexContext,
916     ApexInitParameters* inInitParameters);
917 
918 
919 EXPORT ApexStatus CALL_CONVENTION ApexEnd(void* inApexContext);
920 
921 
922 EXPORT ApexStatus CALL_CONVENTION ApexGetLibVersion(void*
923     inApexContext, ApexVersion* outVersion);
924 
925 
926 EXPORT ApexStatus CALL_CONVENTION ApexGetFileInfo(void*
927     inApexContext, T_S8 inFullFilename[K_APEX_FILE_PATH_MAX_SIZE],
928     ApexFileInfo* outFileHeaderInfo);
929 
930 
931 EXPORT ApexStatus CALL_CONVENTION ApexCheckConfigFiles(void*
932     inApexContext, ApexCheckConfigFilesInputParameters* inputParameters);
933 
934 
935 EXPORT ApexStatus CALL_CONVENTION ApexSetContext(void* inApexContext,
936     ApexContextParamId inParamId, void* inParamConfig);
937 
938 
939 EXPORT ApexStatus CALL_CONVENTION ApexSetCallback(void*
940     inApexContext, ApexCallbackId inCallbackId, void* inCallbackPtr, void* in
941 
942 
```

```
1282 EXPORT ApexStatus CALL_CONVENTION ApexGetDetailedStatus(void*  
    inApexContext, ApexLastError* outLastError);  
1283  
1284  
1356 EXPORT ApexStatus CALL_CONVENTION ApexRead(void* inApexContext,  
    ApexReadCardInputParameters* inputParameters, ApexReadCardOutputData* out  
1357  
1382 EXPORT ApexStatus CALL_CONVENTION ApexGetCardBinaries(void*  
    inApexContext, ApexCardBinaries* outCardBinaries);  
1383  
1405 EXPORT ApexStatus CALL_CONVENTION ApexCleanCache(void* inApexContext);  
1406  
1433 EXPORT ApexStatus CALL_CONVENTION ApexFreeData(void* inApexContext,  
    ApexDataTypeId inDataTypeId, void* inData);  
1434  
1438 /* -----  
----- *  
1439 * - API-APEX functions prototype -----  
----- *  
1440 * - External Interface to Validation -----  
----- *  
1441 * -----  
----- */  
1442  
1526 EXPORT ApexStatus CALL_CONVENTION ApexValidate(void* inApexContext);  
1527  
1528  
1652 EXPORT ApexStatus CALL_CONVENTION ApexConfigurePreSelection(void*  
    inApexContext, ApexConfigurePreSelectionParameters*  
    inConfigurePreSelectionParameters, ApexPreSelectionConfiguration* inOutPr  
1653  
1654  
1700 EXPORT ApexStatus CALL_CONVENTION ApexPreSelection(void*  
    inApexContext, ApexPreSelectionParameters* inPreSelectionParameters);  
1701  
1706 /* -----  
----- *  
1707 * - API-APEX functions prototype -----  
----- *  
1708 * - External Interface to Control -----  
----- *  
1709 * -----  
----- */  
1710  
1746 EXPORT ApexStatus CALL_CONVENTION ApexGetInfractionAttributes(void*  
    inApexContext, ApexInfractionAttributes* outInfractionAttributes);  
1747  
1782 EXPORT ApexStatus CALL_CONVENTION ApexGetInfractions(void*  
    inApexContext, ApexGetInfractionsInputParameters* inputParameters,  
    ApexInfractions* outInfractions);  
1783  
1784  
1815 EXPORT ApexStatus CALL_CONVENTION ApexGetFineAttributes(void*  
    inApexContext, ApexFineAttributes* outFineAttributes);
```

```
1816
1817
1851 EXPORT ApexStatus CALL_CONVENTION ApexGetFines(void* inApexContext,
    ApexGetFinesInputParameters* inputParameters, ApexFines* outFines);
1852
1853
1884 EXPORT ApexStatus CALL_CONVENTION ApexGetLines(void* inApexContext,
    ApexGetLinesInputParameters* inputParameters, ApexLinesInfo* outLinesInfo);
1885
1886
1960 EXPORT ApexStatus CALL_CONVENTION ApexControl(void* inApexContext,
    ApexControlOutputData* outControlOutputData);
1961
2006 EXPORT ApexStatus CALL_CONVENTION ApexPaperControl(void*
    inApexContext, T_S8
    inSecurityData[K_APEX_PAPER_TICKET_SECURITY_DATA_MAX_SIZE],
    ApexControlOutputData* outControlOutputData);
2007
2143 EXPORT ApexStatus CALL_CONVENTION ApexControlAck(void* inApexContext,
    T_S8 inTransactionId[K_APEX_TRANSACTION_ID_MAX_SIZE], ApexControlStatus
    inControlStatus, ApexControlFine* inControlFine, ApexDamagedCardInfo* inD
2144
2145
2150 /* -----
-----*/
2151 * - API-APEX functions prototype -----
----- *
2152 * - External Interface to Personalization -----
----- *
2153 * -----
-----*/
2154
2203 EXPORT ApexStatus CALL_CONVENTION ApexInvalidate(void* inApexContext);
2204
2205
2247 EXPORT ApexStatus CALL_CONVENTION ApexRehabilitate(void* inApexContext)
2248
2249
2320 EXPORT ApexStatus CALL_CONVENTION ApexIssue(void* inApexContext,
    ApexIssueData* inIssueData);
2321
2322
2323
2328 /* -----
-----*/
2329 * - API-APEX functions prototype -----
----- *
2330 * - External Interface to Load -----
----- *
2331 * -----
-----*/
2332
2375 EXPORT ApexStatus CALL_CONVENTION ApexGetCatalog(void* inApexContext,
    ApexGetCatalogParameters* inGetCatalogParameters, ApexCatalog* outCatalog
```

```
2376
2377
2467 EXPORT ApexStatus CALL_CONVENTION ApexConfigureProduct(void*
    inApexContext, ApexConfigureProductParameters*
    inConfigureProductParameters, ApexProductConfiguration* inOutProductConfig
2468
2469
2549 EXPORT ApexStatus CALL_CONVENTION ApexLoad(void* inApexContext,
    ApexPaymentInfo* inPaymentInfo, T_S8 inApexConfigurationId[K_APEX_CONFIGU
2550
2591 EXPORT ApexStatus CALL_CONVENTION ApexGreenlistLoad(void*
    inApexContext, ApexGreenlistLoadParameters* inGreenlistLoadParameters);
2592
2638 EXPORT ApexStatus CALL_CONVENTION ApexUndo(void* inApexContext,
    ApexPaymentInfo* inPaymentInfo, T_S8 inTransactionCsv[K_APEX_CSV_MAX_SIZE]
2639
2640
2788 EXPORT ApexStatus CALL_CONVENTION ApexTransfer(void* inApexContext,
    ApexTransferParameters* inTransferParameters);
2789
2790
2834 EXPORT ApexStatus CALL_CONVENTION ApexRemove(void* inApexContext,
    T_U8 inContractNumber);
2835
2836
2885 EXPORT ApexStatus CALL_CONVENTION ApexCancel(void* inApexContext,
    ApexCancelParameters* inCancelParameters);
2886
2887
2967 EXPORT ApexStatus CALL_CONVENTION ApexPaperSale(void* inApexContext,
    T_S8 inProductId[K_APEX_PRODUCT_ID_MAX_SIZE], ApexPaymentInfo*
    inPaymentInfo, ApexPaperTicketData* outPaperTicketData);
2968
2969
3023 EXPORT ApexStatus CALL_CONVENTION ApexPaperSaleAck(void*
    inApexContext, ApexPaperSaleAckMode inPaperSaleAckMode,
    ApexPaperSaleAckParameters* inPaperSaleAckParameters);
3024
3025
3072 EXPORT ApexStatus CALL_CONVENTION ApexVerify(void* inApexContext);
3073
3074
3113 EXPORT ApexStatus CALL_CONVENTION ApexTripRefund(void* inApexContext,
    T_S8 inValidationCsv[K_APEX_CSV_MAX_SIZE]);
3114
3115
3116
3117
3123 /* -----
-----*
3124 * - API-APEX functions prototype -----
-----*
3125 * - External Interface to Reader Management -----
-----*
```

```

3126 | * -----
-----*/
3127 |
3182 | EXPORT ApexStatus CALL_CONVENTION ApexAddCardReader(void*
   inApexContext, ApexCardReaderConfig* inCardReaderConfig);
3183 |
3208 | EXPORT ApexStatus CALL_CONVENTION ApexRemoveCardReader(void*
   inApexContext, T_U8 inCardReaderId);
3209 |
3263 | EXPORT ApexStatus CALL_CONVENTION ApexAddSamReader(void*
   inApexContext, ApexSamReaderConfig* inSamReaderConfig, T_U32* outSamSerial
3264 |
3289 | EXPORT ApexStatus CALL_CONVENTION ApexRemoveSamReader(void*
   inApexContext, T_U8 inSamReaderId);
3290 |
3342 | EXPORT ApexStatus CALL_CONVENTION ApexAddCardSamAssociation(void*
   inApexContext, ApexCardSamAssociation* inCardSamAssociation);
3343 |
3365 | EXPORT ApexStatus CALL_CONVENTION ApexRemoveCardSamAssociation(void* in
3366 |
3370 | /* -----
-----*/
3371 | * - API-APEX functions prototype -----
----- *
3372 | * - External Interface to Central System Support -----
----- *
3373 | * -----
-----*/
3374 |
3403 | EXPORT ApexStatus CALL_CONVENTION ApexVerifyTransaction(void*
   inApexContext, T_S8 inTransactionCsv[K_APEX_CSV_MAX_SIZE]);
3404 |
3405 |
3436 | EXPORT ApexStatus CALL_CONVENTION ApexDecodeTransaction(void*
   inApexContext, T_S8 inTransactionCsv[K_APEX_CSV_MAX_SIZE], T_U32* outTransactionJsonLength, T_S8** outTransactionJson);
3437 |
3442 #ifdef __cplusplus
3443 }
3444 #endif /* __cplusplus */
3445 |
3446 #endif /* __API_APEX_H */

```

Graph Legend

This page explains how to interpret the graphs that are generated by doxygen.

Consider the following example:

```
/*! Invisible class because of truncation */
class Invisible { };

/*! Truncated class, inheritance relation is
   hidden */
class Truncated : public Invisible { };

/* Class not documented with doxygen comments */
class Undocumented { };

/*! Class that is inherited using public
   inheritance */
class PublicBase : public Truncated { };

/*! A template class */
template<class T> class Templ { };

/*! Class that is inherited using protected
   inheritance */
class ProtectedBase { };

/*! Class that is inherited using private
   inheritance */
```

```

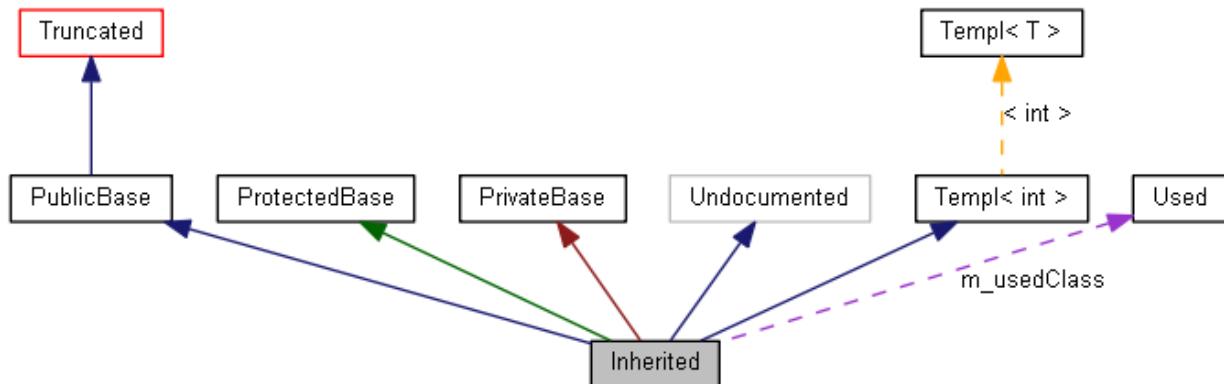
class PrivateBase { };

/*! Class that is used by the Inherited class */
class Used { };

/*! Super class that inherits a number of other
   classes */
class Inherited : public PublicBase,
                    protected ProtectedBase,
                    private PrivateBase,
                    public Undocumented,
                    public Templ<int>
{
private:
    Used *m_usedClass;
};

```

This will result in the following graph:



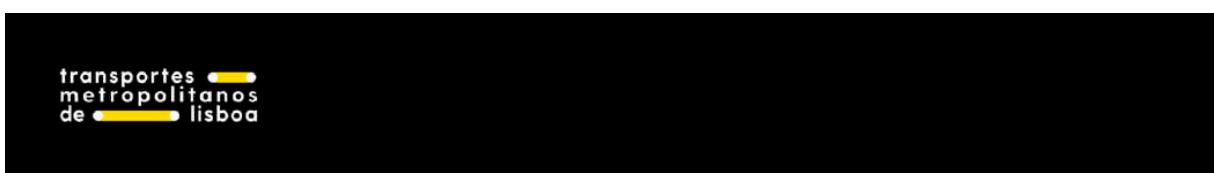
The boxes in the above graph have the following meaning:

- A filled gray box represents the struct or class for which the graph is generated.
- A box with a black border denotes a documented struct or class.
- A box with a gray border denotes an undocumented struct or class.
- A box with a red border denotes a documented struct or class for which not all inheritance/containment relations are shown. A

graph is truncated if it does not fit within the specified boundaries.

The arrows have the following meaning:

- A dark blue arrow is used to visualize a public inheritance relation between two classes.
- A dark green arrow is used for protected inheritance.
- A dark red arrow is used for private inheritance.
- A purple dashed arrow is used if a class is contained or used by another class. The arrow is labelled with the variable(s) through which the pointed class or struct is accessible.
- A yellow dashed arrow denotes a relation between a template instance and the template class it was instantiated from. The arrow is labelled with the template parameters of the instance.



apexLog.h

Go to the documentation of this file.

```
1
28 #ifndef __APEX_LOG_H
29 #define __APEX_LOG_H
30
31
32 /* -----
33 * - Includes -
34 * -----
35
36 #include "apexGlb.h"
37
38 // API VIVA header files
39 #include "osCfg.h"
40
41
42 #ifdef __cplusplus
43 extern "C" {
44 #endif /* __cplusplus */
45
46
47 /* -----
48 * - Defines -
49 * -----
```

```
49 |     * ----- */
50 |
52 | #define K_APEX_LOG_FILENAME_DEFAULT
53 |     "api_apex.log"
54 |
55 | /* ----- */
56 |     * - Type Definitions -----
57 |     * ----- */
58 |
59 |
60 |
64 | typedef enum {
65 |
67 |     APEX_LOG_LEVEL_NONE = 0,
68 |
70 |     APEX_LOG_LEVEL_ERROR = 1,
71 |
73 |     APEX_LOG_LEVEL_WARNING = 2,
74 |
76 |     APEX_LOG_LEVEL_INFO = 3,
77 |
79 |     APEX_LOG_LEVEL_DEBUG = 4
80 |
81 } ApexLogLevel;
82 |
83 |
84 |
88 | typedef enum {
89 |
91 |     APEX_LOG_MESSAGE_TYPE_ERROR = 1,
92 |
94 |     APEX_LOG_MESSAGE_TYPE_WARNING = 2,
95 |
97 |     APEX_LOG_MESSAGE_TYPE_INFO = 3,
```

```
98
100     APEX_LOG_MESSAGE_TYPE_DEBUG = 4
101
102 } ApexLogMessageType;
103
104
108 typedef enum
109 {
115     APEX_LOG_TYPE_INTERNAL_FILE = 0,
116
122     APEX_LOG_TYPE_EXTERNAL_CALLBACK = 1
123
124 } ApexLogType;
125
126
134 typedef void (CALLBACK* F_CB_ExternalLogger)
    (ApexLogMessageType inMessageType, T_S8* inMessage)
135
136
142 typedef struct
143 {
145     ApexLogType logType;
146
148     ApexLogLevel logLevel;
149
155     T_S8 fullFileName[K_APEX_FILE_PATH_MAX_SIZE];
156
162     F_CB_ExternalLogger externalLogger;
163
164 } ApexLogConfig;
165
166
167 #ifdef __cplusplus
168 }
169 #endif /* __cplusplus */
170
171 #endif /* __APEX_LOG_H */
```

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Directories

directory [api_apex](#)

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api_apex Directory Reference

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include Directory Reference

Files

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