Payments

The payments module provides credit and debit card scanning capabilities to a kiosk application. Current supported payment providers are:

- FreedomPay
- WorldPay

Getting Started

First you will need to determine the payment gateway that you would like your app to use. If you need help selecting a payment gateway, talk to your representative at Zivelo. They can inform you about the various options.

Once you've selected a payment provider, you'll need to make sure you have the hardware that you need. All payment providers have card scanners and local services that will need to run on the same network as your kiosk app. Depending on the provider, some of these services may require their own physical machine due to Operating Systems dependencies or PCI requirements. Consult the documentation for your specific payment provider for details on setting this up.

- [FreedomPay Setup (docs/freedompay-setup.md)](docs/freedompay-setup.md)

Using Our Payment Demo App

Once you have your card scanner and provider services set up, you're ready to test with our demo app. This will help you ensure that everything is connected properly, and to troubleshoot any issues in a simplified and well known environment.

You can find [instructions for the demo app here (https://github.com/OakLabsInc/payment-demo/)](https://github.com/OakLabsInc/payment-demo/). When everything is working there, you're ready to start integration with your own app.

Testing With Your App

In OakOS you can run this module along side your app by adding it to the configuration you send to `/application/install`:

```
{
  "services": [
    {
      "image": "index.docker.io/oaklabs/component-payment:0.0.11",
      "username": "{{dockerUsername}}",
      "password": "{{dockerPassword}}"
    },
    {
      "image": "[your-app-here]",
      "username": "{{dockerUsername}}",
      "password": "{{dockerPassword}}"
    }
  ]
}
```

The Payment module by default listens for gRPC requests on port 9142 and for REST requests on port 9143. So from a web application usually the easiest thing is to make your requests at `http://0.0.0.0:9143`. Take a look at the demo app code above for examples on exactly how to do this from a web application.

API Documentation

- [API (docs/api.md)](docs/api.md)
- [FreedomPay Error Codes (docs/freedompay_error_codes.pdf)](docs/freedompay_error_codes.pdf)

Zivelo Development Docs

- [Dev Process (docs/development.md)](docs/development.md)

FreedomPay Services Setup

For FreedomPay development you should receive the following from Zivelo:

- A windows machine pre-installed with FreedomPay services
- A card scanner pre-installed with FreedomPay firmware
- A front facing plate adapter to mount the card scanner to your kiosk

This is in addition to the OakOS machine you will be developing your application on. Please contact your Zivelo representative if you are missing any components.

For the physical setup of this hardware, you should ensure the following:

1. The card scanner is connected via USB to the Windows machine with FreedomPay services.
2. The windows machine is connected via network cable to the same router or switch that hosts the OakOS machine.
3. The windows machine and OakOS machine should be mounted to the inside of the kiosk, and the card scanner should be mounted to the front of the kiosk with the provided adapter.

Please talk with the Zivelo technical team when this has been completed and we can run a test purchase with the FreedomPay services to ensure that everything is connected properly.

When that is done you're ready to make the connection from our OakOS Payment Sample App.

Protocol Documentation

Table of Contents

payment.proto

PaymentConfiguration

Field	Type	Label	Description
providers	PaymentProvider	repeated	

PaymentProvider

Field	Type	Label	Description
provider_name	string		required
provider_type	PaymentProviderType		required
solution	PaymentSolutionType		optional
host	string		required for most solutions... location of payment service on LAN or WWW
api_id	string		optional... credentials for authenticated provider, WorldPay's Developer Key
api_key	string		optional... credentials for authenticated provider, WOrldPay's Developer Secret
batch_interval	PaymentProvider.BatchInterval		
batch_hour	int32		0-23
location_id	string		required for FreedomPay
terminal_id	string		required for FreedomPay
environment_description	string		optional
application_id	int32		required for WorldPay
lane_id	int32		required for WorldPay

PaymentServiceInfo

Field	Type	Label	Description
configured	bool		
configuration	PaymentConfiguration		

SaleRequest

Field	Type	Label	Description
sale_request	StandardSaleRequest		
freedompay_request	FreedomPayRequest		
worldpay_request	WorldPayRequest		

SaleResponse

Field	Type	Label	Description
provider_type	PaymentProviderType		
response	StandardSaleResponse		
freedompay_response	FreedomPayResponse		
worldpay_response	WorldPayResponse		

StandardSaleRequest

Field	Type	Label	Description
provider_name	string		one of the PaymentProviders provided in configuration
amount	string		string containing dollars/cents, decimal separated
currency	Currency		
transaction_id	string		
location_id	string		
terminal_id	int32		
merchant_ref	string		required for FreedomPay
invoice_number	string		
request_id	string		to capture the auth with the corresponding request_id, or other "follow-on" requests

StandardSaleResponse

Field	Type	Label	Description
status	ResponseStatus		
error	string		
sale_amount	string		
currency	Currency		
masked_card_number	string		
name_on_card	string		
transaction_id	string		
card_issuer	string		
request_id	string		Generated by payment provider. Can be used to refer to this request in "follow-on" requests.

Currency

Name	Number	Description
USD	0	

PaymentProvider.BatchInterval

Name	Number	Description

Name	Number	Description
OFF	0	
DAILY	1	
WEEKLY	2	

PaymentProviderType

Name	Number	Description
TEST	0	
FREEDOMPAY	1	
WORLDPAY	2	

PaymentSolutionType

Name	Number	Description
DEFAULT	0	
POS	1	
CLOUD	2	

ResponseStatus

Name	Number	Description
INTERNAL_ERROR	0	something internal failed
ACCEPTED	1	success
REJECTED	2	insufficient funds, bad card, etc.
INPUT_ERROR	3	bad input

Payment

Method Name	Request Type	Response Type	Description
Info	.google.protobuf.Empty	PaymentServiceInfo	
Configure	PaymentConfiguration	.google.protobuf.Empty	
Sale	SaleRequest	SaleResponse	
Auth	SaleRequest	SaleResponse	
Capture	SaleRequest	SaleResponse	
Cancel	SaleRequest	SaleResponse	

Scalar Value Types

.proto Type	Notes	C++ Type	Java Type	Python Type
double		double	double	float
float		float	float	float
int32	Uses variable-length encoding. Inefficient for encoding negative numbers – if your field is likely to have negative values, use sint32 instead.	int32	int	int
int64	Uses variable-length encoding. Inefficient for encoding negative numbers – if your field is likely to have negative values, use sint64 instead.	int64	long	int/long
uint32	Uses variable-length encoding.	uint32	int	int/long
uint64	Uses variable-length encoding.	uint64	long	int/long
sint32	Uses variable-length encoding. Signed int value. These more efficiently encode negative numbers than regular int32s.	int32	int	int
sint64	Uses variable-length encoding. Signed int value. These more efficiently encode negative numbers than regular int64s.	int64	long	int/long

.proto Type	Notes	C++ Type	Java Type	Python Type
fixed32	Always four bytes. More efficient than uint32 if values are often greater than 2^28.	uint32	int	int
fixed64	Always eight bytes. More efficient than uint64 if values are often greater than 2^56.	uint64	long	int/long
sfixed32	Always four bytes.	int32	int	int
sfixed64	Always eight bytes.	int64	long	int/long
bool		bool	boolean	boolean
string	A string must always contain UTF-8 encoded or 7-bit ASCII text.	string	String	str/unicode
bytes	May contain any arbitrary sequence of bytes.	string	ByteString	str

.proto Type	Notes	C++ Type	Java Type	Python Type

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Freeway Commerce Connect Error Codes:

- **3000   Timeout Reversal**   Indicates that a request was made to Freeway which timed out. A Timeout reversal request was sent to Freeway which voided the transaction. Not entered in the System Event Log.
- **3001   Freeway Connection Error (Timeout Reversal Failure)**   Indicates that a request was made to Freeway which timed out. A Timeout Reversal Request was then sent to Freeway which also timed out. The most likely explanation for this error is some sort of network failure. It is likely, but not certain, that the original request never got to Freeway. Entered on the System Event Log.
- **3002   No Workstation ID Specified**   FCC Server received a request from POS which requires a card-present transaction but there was no workstation id. Almost certainly due to a misconfiguration of the POS sytem. Entered on the System Event Log.
- **3003   Workstation ID Unknown**   FCC Server received a request to be sent to a Workstation that which it does not know about. This implies that the POS system can communicate with the workstation but FCC Server cannot. It might possibly indicate an error in FCC Client. Its status and its logs should be examined. Entered on the System Event Log.
- **3004   Unsupported Opera Message**   *Opera-specific*. FCC Server received an Opera Message (or message mode) that it does not support. FCC Server does not support most Opera Messages and some modes of those it does support. This either means that Opera has been misconfigured or that we have encountered a use case which was not anticipated. Entered on the System Event Log.
- **3005   MerchantReferenceCode, Transaction or Request ID Not Found**The MerchantReferenceCode, TransactionID or RequestID specified by the POS system was not found in the FCC Server database. This IDs are used to track follow on operations such as incremental authorizations and settlements. Failure to find the entry in the database might be due to a failed Database rollover or a misconfiguration of the POS sytem. More detailed information about the error can be found in the log. Entered on the System Event Log.
- **3006   Database Access Failure**   FCC Server attempted to access its database and failed to do so. More detailed information about the error can be found in the log. This is likely a network or configuration error. It indicates a serious error if running in stand-alone mode. Entered on the System Event Log.
- **3007   Authorization Not Allowed**   An Incremental Authorization was attempted on a card type which does not support it such as Debit.
- **3008   Internal Error**   FCC Server encountered a state which was unexpected. It may indicate a bug in the operation of one of the system components (FCC Server, FCC Client or the POS System). More detailed information about the error can be found in the log. Entered on the System Event Log.
- **3009   FCC Client Comm Error** *Applicable to Client/Server configurations of the FCC.* Communication with the FCC Client was lost, probably caused by a timeout but maybe something more severe. If a timeout happens during a request, the connection is closed automatically. If everything is actually in order, FCC Client will re-establish communication within ten seconds and everything will continue normally. More detailed information about the error can be found in the log. Entered on the System Event Log.
- **3010   Invalid POS Request**   The POS system sent a request containing invalid data. Not entered on the System Event Log.

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- **3011   POS Connection Lost**   An attempt to send a *POS Response* failed because the connection was closed before FCC Server could respond, possibly due to network issues. More detailed information about the error can be found in the log. Entered on the System Event Log.
- **3012   Generic Error**
- **3015   Multiple FCC Client Requests**   A second request was made to invoke FCC Client before a previous one was complete. This is definitely due to a configuration error, possibly because more than one workstation has the same ID. Entered on the System Event Log.
- **3018   Cancel Failure**   An attempt to service a Cancel request failed. Entered on the System Event Log.
- **3019   Request ID Not Found**   The specified request ID was not found. Entered on the System Event log.
- **3020   Badly Formatted Request**   The request is not valid. The error message gives more information about the problem.
- **3021   Offline Accept**   A request was accepted offline.
- **3022   Offline Decline**   A request was declined offline, likely because the amount specified is over the floor limit.
- **3024   Forced Offline**   A request was processed as an offline transaction. This will usually be overwritted with a 3021 or 3022. If seen, a unhandled path has been triggered.
- **3026   Offline Processing Error**   This error is return when the offline daemon refused to process a request because a previous request in the same transaction failed.
- **3027   Request Not Allowed Offline**   This error is returned if the system is offline and the POS request cannot be performed in this mode.
- **3028   Signature Request**   This error code is returned for a signature only request.
- **3029   Closed Client Connection**   The client lost connectivity in the middle of a transactions. Can be caused by an abort request on another lane, or a restart of the client mid-transaction.
- **3030   Lane Timout**   If the MSR device does not respond with card information within the timeout.
- **3102   MsrLib No Response**   The device library did not return a valid response.
- **3120   No Device**   No device attached.
- **3121   Device Error**   The device encountered an error.
- **3122   Network Error**   The library cannot connect to an IP device.
- **3123   Token Error**   Encountered an error while attempting tokenize.
- **3124   EMV Application Blocked**   The application selected on a chip card is not accepted by this merchant.
- **3125   Card Blocked**   This card type is not supported by the merchant.
- **3126   Chip Decline**   The host approved the transaction but the chip declined it.
- **3127   Bad Card**   An issue with the card was encountered.
- **3128   Device Timeout**   The device did not respond.
- **3129   Bad Request**   Bad request sent to device.
- **3130   Driver Error**   A problem was encountered from the driver.

- **3131** **Offline** Operation not allowed in offline mode.
- **3132** **Invalid PIN** The PIN entered is invalid.
- **3133** **User Cancel** A user clicked the cancel button.
- **3134** **Card Removed Prematurely** The user removed a chip card before the transaction was complete.
- **3135** **Unknown Error** An unknown error occurred.
- **3136** **Internal Error** An internal erorr occurred.
- **3137** **Aborted** Result of an abort command. Graceful shutdown of client.
- **3138** **Declined** A request was declined.
- **3139** **Voice Auth** Voice Auth Required
- **3140** **Not Supported** An invalid request: Token type not specified, Debit RFID, Device does not support sigcap
- **3141** **Device Busy** Device is already processing a request.

Freeway Error Codes:

Code	Class	Description	Recommended Action	Other Notes
100	General	Approved		
101	General	One or more required fields missing from the request	Consult the missingFields entry in the reply	
102	General	One or more fields in the request contain invalid data	Consult the invalidFields entry in the reply	

Code	Class	Description	Recommended Action	Other Notes
103	General	An invalid combination of services was requested		
104	General	Duplicate transaction		
111	EFV	One or more fields contains invalid data		
112	EFV	One or more required fields missing		
149	General	Issue occurred processing request; unknown error	Contact Freedompay immediately	
150	General	Issue occurred processing request; application error	A fatal error occurred while processing the request. Do not retry the transaction; contact Freedompay immediately.	
151	General	An internal timeout occurred while processing the request	Try again	
152	General	An internal error occurred while communicating with the card processor	Contact Freedompay immediately	
153	General	Unable to communicate with card processor	Try again	
154	General	Invalid card processor configuration	Contact Freedompay immediately	
161	General	Invalid Business Date / Business Date earlier than the most recent date		
201	Payment	Call issuing bank for authorization		
202	Payment	Expired card (or mismatched expiry date provided)	Obtain an updated card	
203	Payment	Declined by issuing bank – unspecified reason		
204	Payment	Insufficient funds		Some issuers return this for over-limit credit cards
205	Payment	Lost or stolen card		
206	Payment	Stolen card		

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Code	Class	Description	Recommended Action	Other Notes
207	Payment	Issuing bank unavailable to authorize request		
208	Payment	The card is not active or not eligible for this type of transaction		
209	Payment	Incorrect PIN		Some issuers return this if the number of failed PIN attempts is exceeded
210	Payment	Card over limit		
211	Payment	Incorrect card verification number (CVC/CVV2/CID)		
212	Payment	Invalid PIN Data		
213	Payment	Card not valid at this location		
214	Payment	Invalid Track Data		
220	Payment	Issuing bank rejected the transaction due to generic account problem		
221	Payment	Suspected fraud		
222	Payment	Account is frozen		
229	Payment	Merchant Configuration error	Contact Freedompay immediately	
231	Payment	Invalid account number		
232	Payment	Card Type not enabled for merchant	Contact FreedomPay immediately	
233	Payment	Processor rejected the transaction due to an issue with the request		
234	Payment	Invalid merchant credentials	Contact FreedomPay immediately	
235	Payment	Return amount exceeds the amount of original authorization		Currently applicable to stored value cards only
236	Payment	Processor reported an error while attempting to process the request	Try again	

Code	Class	Description	Recommended Action	Other Notes
237	Payment	Processor reported an error while attempting to process the request	Contact FreedomPay immediately	
238	Payment	The authorization has already been captured		
239	Payment	The capture amount was for more than the authorization amount		Capture amount > Authorization amount is not necessarily an error. This is returned when it is.
241	Payment	Invalid Request ID		
242	Payment	No un-captured authorization record was found		
243	Payment	The transaction is already settled		
245	Payment	The transaction contains both card data and an orderRequestID, but the card data does not match that from the original transcation		
246	Payment	The transaction cannot be voided		
247	Payment	The transaction has already been voided		
248	Payment	The authorization for this transaction is no longer valid		
250	Payment	A timeout occurred while waiting for a response from the processor	Try again	
251	Payment	Processor or issuing bank does not support this transaction		
252	Payment	The processor is not available	Try again	
253	Payment	Merchant is not allowed to perform this transaction		
261	eMSR Hardware	Track Data decryption error	Contact Freedompay immediately	
262	eMSR Hardware	Device Not Supported	Contact Freedompay immediately	
263	eMSR Hardware	Encryption Mode Not Supported	Contact Freedompay immediately	
264	eMSR Hardware	Key set not registered	Contact Freedompay immediately	

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Code	Class	Description	Recommended Action	Other Notes
271	MicroFrame	Invalid or inactive moniker		
281	Payment	Private Label account bankrupt		
282	Payment	Private Label account closed		
284	Payment	Private Label card is revoked		
285	Payment	Private Label card is charged off		
287	Payment	AVS/CVN Validation code not whitelisted		
300	Promo / Terms	An error occurred in communicating with the Promotion Engine	Try again	
301	Promo / Terms	The submitted transaction contains more than one promotion, but the remote system supports only one promotion code per transaction		
302	Promo / Terms	The invoice would have zero value		
310	Promo / Terms	Requested promotion(s) failed validation.	Check requirements for the promotion	
311	Promo / Terms	The available window for this promotion has expired		
312	Promo / Terms	This card is not eligible for this promotion	Check requirements for the promotion	
313	Promo / Terms	This merchant is not eligible for this promotion	Check requirements for the promotion	
314	Promo / Terms	The promotion is not valid at this time	Check requirements for the promotion	
315	Promo / Terms	The scenario code specified for this promotion was not valid	Check requirements for the promotion	
316	Promo / Terms	The merchant has not opted-in for the promotion	Check requirements for the promotion	
317	Promo / Terms	The promotion engine found different available promotions than the one specified		Returned only for lookups

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Code	Class	Description	Recommended Action	Other Notes
320	Promo / Terms	The merchant is not correctly configured for discounts (Program not found)		Indicates a configuration error in Freeway
322	Promo / Terms	This card is not eligible for any terms promotions		
323	Promo / Terms	This merchant is not registered for this program		
324	Promo / Terms	The entered promotion was not found		(Validates only)
330	Promo / Terms	The invoice did not satisfy the rules of the promotion requested		
335	Promo / Terms	The qualifying subtotal is not within the purchase amount bounds of this promotion		
336	Promo / Terms	The qualifying quantity is not within the amount bounds of this promotion		
337	Promo / Terms	The eligible subtotal is not within the purchase amount bounds of this promotion		
338	Promo / Terms	The qualifying subtotal is not within the percentage purchase amount bounds of this promotion		
339	Promo / Terms	The invoice amount is not within the purchase amount bounds of this promotion		
340	Promo / Terms	No products on the invoice qualify for the promotion requested		
341	Promo / Terms	The product does not qualify for the promotion requested		
342	Promo / Terms	The product does not qualify for the promotion requested		
343	Promo / Terms	The product does not qualify for the promotion requested		
344	Promo / Terms	The sale code did not apply for the promotion requested		

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Code	Class	Description	Recommended Action	Other Notes
345	Promo / Terms	The unit price submitted was either too high or too low for the promotion requested		
346	Promo	The quantity submitted was either too high or too low for the promotion requested		
347	Promo	The subtotal submitted was either too high or too low for the promotion requested		
348	Promo	The non-qualifying items exceeded the threshold amount allowed by this promotion		
401	Tokens	Error retrieving payment information from Token service	Try again later	Also used for mobile payments
402	Tokens	Expired token (mobile only)		
408	Tokens	Disabled token (mobile only)		
410	Tokens	Token over limit (mobile only)		
431	Tokens	Invalid token		
451	Tokens	Unsupported request		
491	Tokens	Type of card backed by token does not match the type of card sent to Freway		
701	DCC	Successful retrieval of DCC Information Card is eligible	Ask if customer wants to use DCC rates	
702	DCC	Card is not eligible for DCC		

5. CVV and AVS Codes

CVV:

Code	Description
D	The transaction was determined to be suspicious by the issuing bank.
I	The CVN failed the processor's data validation check.
M	The CVN matched.
N	The CVN did not match.
P	The CVN was not processed by the processor for an unspecified reason.
S	The CVN is on the card but was not included in the request.
U	Card verification is not supported by the issuing bank.
X	Card verification is not supported by the card association.
1	Card verification is not supported for this processor or card type.
2	An unrecognized result code was returned by the processor for the card verification response.
3	No result code was returned by the processor.

AVS:

Code	Description	Network
A	Street address matches, but 5-digit and 9-digit postal code do not.	Standard domestic
B	Street address matches, but postal code not verified.	Standard international

C	Street address and postal code do not match.	Standard international
D	Street address and postal code match. Code "M" is equivalent.	Standard international
E	AVS data is invalid or AVS is not allowed for this card type.	Standard domestic
F	Card member's name does not match, but billing postal code matches.	American Express only
G	Non-U.S. issuing bank does not support AVS.	Standard international
H	Card member's name does not match. Street address and postal code match.	American Express only
I	Address not verified.	Standard international
J	Card member's name, billing address, and postal code match.	American Express only
K	Card member's name matches but billing address and billing postal code do not match.	American Express only
L	Card member's name and billing postal code match, but billing address does not match.	American Express only
M	Street address and postal code match. Code "D" is equivalent.	Standard international
N	Street address and postal code do not match.	Standard domestic
O	Card member's name and billing address match, but billing postal code does not match.	American Express only
P	Postal code matches, but street address not verified.	Standard international
Q	Card member's name, billing address, and postal code match.	American Express only
R	System unavailable.	Standard domestic
S	Bank does not support AVS.	Standard domestic
T	Card member's name does not match, but street address matches.	American Express only
U	Address information unavailable. Returned if the U.S. bank does not support non-U.S. AVS or if the AVS in a U.S. bank is not functioning properly.	Standard domestic
V	Card member's name, billing address, and billing postal code match.	American Express only
W	Street address does not match, but 9-digit postal code matches.	Standard domestic
X	Street address and 9-digit postal code match.	Standard domestic
Y	Street address and 5-digit postal code match.	Standard domestic