```
333 lines (282 sloc) 9.57 KB
      # SPDX-License-Identifier: MIT
      # OpenZeppelin Contracts for Cairo v0.2.0 (account/library.cairo)
  2
  3
  4
      %lang starknet
  5
  6
      from starkware.cairo.common.registers import get_fp_and_pc
  7
      from starkware.starknet.common.syscalls import get_contract_address
  8
      from starkware.cairo.common.signature import verify_ecdsa_signature
      from starkware.cairo.common.cairo_builtins import HashBuiltin, SignatureBuiltin, BitwiseBuiltin
 10
      from starkware.cairo.common.alloc import alloc
 11
      from starkware.cairo.common.uint256 import Uint256
      from starkware.cairo.common.memcpy import memcpy
 13
      from starkware.cairo.common.math import split_felt
 14
      from starkware.cairo.common.bool import TRUE
 15
      from starkware.starknet.common.syscalls import call_contract, get_caller_address, get_tx_info
      from starkware.cairo.common.cairo_secp.signature import verify_eth_signature_uint256
 16
      from openzeppelin.introspection.ERC165 import ERC165
 17
 18
 19
      from openzeppelin.utils.constants import IACCOUNT ID
 20
 21
 22
      # Storage
 23
 24
      @storage_var
      func Account_current_nonce() -> (res: felt):
 26
 27
      end
 28
```

```
29
     @storage_var
30
     func Account_public_key() -> (res: felt):
31
     end
32
33
34
     # Structs
35
36
37
     struct Call:
38
         member to: felt
39
         member selector: felt
         member calldata len: felt
40
         member calldata: felt*
41
42
     end
43
44
     # Tmp struct introduced while we wait for Cairo
     # to support passing `[AccountCall]` to __execute__
45
46
     struct AccountCallArray:
         member to: felt
47
48
         member selector: felt
49
         member data offset: felt
50
         member data len: felt
51
     end
52
53
     namespace Account:
54
55
56
         # Initializer
57
58
59
         func initializer{
60
                  syscall_ptr : felt*,
61
                  pedersen_ptr : HashBuiltin*,
62
                  range_check_ptr
63
             }(_public_key: felt):
64
             Account_public_key.write(_public_key)
             ERC165.register_interface(IACCOUNT ID)
65
66
             return()
67
         end
68
69
         #
70
         # Guards
71
72
73
         func assert_only_self{syscall_ptr : felt*}():
74
             let (self) = get_contract_address()
75
             let (caller) = get_caller_address()
             with_attr error_message("Account: caller is not this account"):
76
77
                  assert self = caller
```

```
78
               end
79
               return ()
80
          end
81
82
83
          # Getters
84
85
86
          func get_public_key{
87
                   syscall_ptr : felt*,
                   pedersen_ptr : HashBuiltin*,
88
89
                   range_check_ptr
90
              }() -> (res: felt):
              let (res) = Account_public_key.read()
91
               return (res=res)
92
93
          end
94
95
          func get nonce{
                   syscall_ptr : felt*,
96
97
                   pedersen_ptr : HashBuiltin*,
98
                   range_check_ptr
99
              }() -> (res: felt):
              let (res) = Account_current_nonce.read()
100
101
              return (res=res)
102
          end
103
104
105
          # Setters
106
107
108
          func set_public_key{
109
                   syscall_ptr : felt*,
110
                   pedersen_ptr : HashBuiltin*,
111
                   range_check_ptr
112
               }(new_public_key: felt):
113
               assert_only_self()
114
              Account_public_key.write(new_public_key)
115
              return ()
116
          end
117
118
          #
119
          # Business logic
120
121
          func is_valid_signature{
122
123
                   syscall_ptr : felt*,
124
                   pedersen_ptr : HashBuiltin*,
                   range_check_ptr,
125
126
                   ecdsa_ptr: SignatureBuiltin*
```

```
127
              }(
128
                  hash: felt,
129
                   signature len: felt,
                   signature: felt*
130
              ) -> (is_valid: felt):
131
132
              let ( public key) = Account public key.read()
133
              # This interface expects a signature pointer and length to make
134
135
              # no assumption about signature validation schemes.
              # But this implementation does, and it expects a (sig_r, sig_s) pair.
136
137
              let sig r = signature[0]
138
              let sig_s = signature[1]
139
140
              verify ecdsa signature(
141
                   message=hash,
142
                  public_key=_public_key,
143
                   signature_r=sig_r,
144
                   signature s=sig s)
145
146
              return (is_valid=TRUE)
147
          end
148
149
       func is_valid_eth_signature{
150
                  syscall_ptr : felt*,
151
                   pedersen ptr : HashBuiltin*,
152
                  bitwise_ptr: BitwiseBuiltin*,
153
                  range_check_ptr
154
              }(
                  hash: felt,
155
156
                  signature_len: felt,
157
                  signature: felt*
              ) -> (is_valid: felt):
158
159
              alloc_locals
160
              let (_public_key) = get_public_key()
161
              let (__fp__, _) = get_fp_and_pc()
162
163
              # This interface expects a signature pointer and length to make
164
              # no assumption about signature validation schemes.
165
              # But this implementation does, and it expects a the sig_v, sig_r,
166
              # sig s, and hash elements.
167
              let sig_v : felt = signature[0]
168
              let sig_r : Uint256 = Uint256(low=signature[1], high=signature[2])
169
              let sig_s : Uint256 = Uint256(low=signature[3], high=signature[4])
170
              let (high, low) = split felt(hash)
171
              let msg_hash : Uint256 = Uint256(low=low, high=high)
172
173
              let (local keccak ptr : felt*) = alloc()
174
175
              with keccak_ptr:
```

```
176
                   verify_eth_signature_uint256(
177
                       msg_hash=msg_hash,
178
                       r=sig r,
179
                       s=sig_s,
180
                       v=sig_v,
181
                       eth address= public key)
182
               end
183
184
               return (is valid=TRUE)
185
          end
186
187
          func execute{
188
                   syscall_ptr : felt*,
189
                   pedersen_ptr : HashBuiltin*,
190
                   range_check_ptr,
                   bitwise_ptr: BitwiseBuiltin*
191
192
              }(
193
                   call array len: felt,
194
                   call_array: AccountCallArray*,
195
                   calldata_len: felt,
196
                   calldata: felt*,
                   nonce: felt
197
              ) -> (response_len: felt, response: felt*):
198
199
              alloc_locals
200
              let (__fp__, _) = get_fp_and_pc()
201
              let (tx_info) = get_tx_info()
202
203
              let (local ecdsa_ptr : SignatureBuiltin*) = alloc()
204
              with ecdsa ptr:
205
                   # validate transaction
206
                   with_attr error_message("Account: invalid signature"):
207
                       let (is_valid) = is_valid_signature(tx_info.transaction_hash, tx_info.signature_le
                       assert is_valid = TRUE
208
209
                   end
210
               end
211
212
              return _unsafe_execute(call_array_len, call_array, calldata_len, calldata, nonce)
213
          end
214
215
          func eth_execute{
216
                   syscall_ptr : felt*,
217
                   pedersen_ptr : HashBuiltin*,
218
                   range_check_ptr,
219
                   bitwise ptr: BitwiseBuiltin*
220
              }(
221
                   call_array_len: felt,
222
                   call array: AccountCallArray*,
                   calldata len: felt,
223
224
                   calldata: felt*,
```

```
225
                  nonce: felt
226
              ) -> (response len: felt, response: felt*):
227
              alloc locals
228
              let (__fp__, _) = get_fp_and_pc()
229
230
              let (tx info) = get tx info()
231
              # validate transaction
232
233
              with attr error message("Account: invalid secp256k1 signature"):
234
                  let (is_valid) = is_valid_eth_signature(tx_info.transaction_hash, tx_info.signature_le
235
                  assert is valid = TRUE
236
              end
237
238
              return _unsafe_execute(call_array_len, call_array, calldata_len, calldata, nonce)
239
          end
240
241
          func _unsafe_execute{
242
                  syscall ptr : felt*,
243
                   pedersen_ptr : HashBuiltin*,
244
                  range_check_ptr,
245
                  bitwise ptr: BitwiseBuiltin*
246
              }(
                  call_array_len: felt,
247
248
                  call_array: AccountCallArray*,
249
                  calldata len: felt,
250
                  calldata: felt*,
                  nonce: felt
251
              ) -> (response_len: felt, response: felt*):
252
253
              alloc locals
254
255
              let (caller) = get_caller_address()
              with_attr error_message("Account: no reentrant call"):
256
257
                  assert caller = 0
258
              end
259
260
              # validate nonce
261
262
              let (_current_nonce) = Account_current_nonce.read()
263
264
              with_attr error_message("Account: nonce is invalid"):
265
                  assert _current_nonce = nonce
266
              end
267
268
              # bump nonce
269
              Account_current_nonce.write(_current_nonce + 1)
270
271
              # TMP: Convert `AccountCallArray` to 'Call'.
              let (calls : Call*) = alloc()
272
              _from_call_array_to_call(call_array_len, call_array, calldata, calls)
273
```

```
274
              let calls_len = call_array_len
275
276
              # execute call
              let (response : felt*) = alloc()
277
              let (response_len) = _execute_list(calls_len, calls, response)
278
279
280
              return (response len=response len, response=response)
281
          end
282
283
          func _execute_list{syscall_ptr: felt*}(
                  calls len: felt,
284
                  calls: Call*,
285
286
                  response: felt*
287
              ) -> (response_len: felt):
              alloc locals
288
289
290
              # if no more calls
291
              if calls len == 0:
292
                 return (0)
293
              end
294
              # do the current call
295
              let this_call: Call = [calls]
296
297
              let res = call_contract(
298
                  contract address=this call.to,
299
                  function_selector=this_call.selector,
300
                  calldata_size=this_call.calldata_len,
301
                  calldata=this_call.calldata
302
              )
303
              # copy the result in response
304
              memcpy(response, res.retdata, res.retdata_size)
305
              # do the next calls recursively
306
              let (response_len) = _execute_list(calls_len - 1, calls + Call.SIZE, response + res.retdat
307
              return (response_len + res.retdata_size)
308
          end
309
310
          func _from_call_array_to_call{syscall_ptr: felt*}(
311
                  call_array_len: felt,
312
                  call_array: AccountCallArray*,
313
                  calldata: felt*,
                  calls: Call*
314
315
              ):
316
              # if no more calls
317
              if call array len == 0:
318
                 return ()
319
              end
320
321
              # parse the current call
322
              assert [calls] = Call(
```

```
323
                      to=[call_array].to,
                      selector=[call_array].selector,
324
                      calldata_len=[call_array].data_len,
325
                      calldata=calldata + [call_array].data_offset
326
327
                  )
              # parse the remaining calls recursively
328
              _from_call_array_to_call(call_array_len - 1, call_array + AccountCallArray.SIZE, calldata,
329
330
              return ()
331
          end
332
333
      end
```