Security Review Report
NM-0478 Braavos

NETHERMIND
SECURITY

(May 8, 2025)

Contents

1 Executive Summary

This document presents the security review performed by Nethermind Security for Braavos Account Wallet implementation designed for the Starknet ecosystem, taking advantage of the built-in account abstraction features from the Starknet network.

The wallet implementation has previously been audited by Nethermind, and this report presents the review of additional features that have been introduced since the last audit engagement. The newly introduced changes include **outside execution being able to call wallet itself** which allows for performing critical actions signed offline, **session key operand conditions** to allow restriction of calldata during session calls and **new fee calculation** which is introduced in Starknet `v0.13.4`.

The audit was performed using (a) manual analysis of the codebase, (b) automated analysis tools, and (c) creation of test cases. **Along this document, we report** 8 points of attention, where one is classified as `Low`, and seven are classified as `Informational` or `Best Practice`. The issues are summarized in Fig. 1. At the end of the engagement after all fixes were applied, the class hashes for the base account and full account implementations are listed below:

- Braavos Account Classhash: `0x03957f9f5a1cbfe918cedc2015c85200ca51a5f7506ecb6de98a5207b759bf8a`
- Braavos MOA Account Classhash: `0x003a4c71a7e8aa5eec24c87a54a9063dad4b336a14e082a3cf77c13710342e94`

This document is organized as follows. Section 2 presents the files in the scope. Section 3 summarizes the issues. Section 4 presents the system overview. Section 5 discusses the risk rating methodology. Section 6 details the issues. Section 7 discusses the documentation provided by the client for this audit. Section 8 presents the compilation, tests, and automated tests. Section 9 concludes the document.

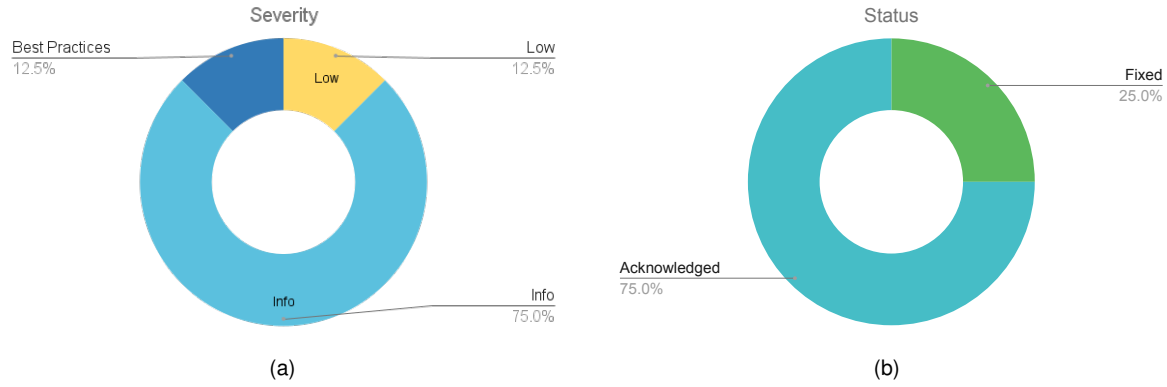

Fig. 1: Distribution of issues: Critical (0), **High** (0), **Medium** (0), **Low** (1), **Undetermined** (0), **Informational** (6), **Best Practices** (1). **Distribution of status: Fixed** (2), **Acknowledged** (6), **Mitigated** (0), **Unresolved** (0)

Summary of the Audit

Audit Type	Security Review
Initial Report	March 26, 2025
Response from Client	Regular responses during audit engagement
Final Report	May 8, 2025
Repository	`myBraavos/braavos-account-cairo`
Commit	`bb58dec977cd3b1406388292e3b68283bc87f537`
Final Commit	`1e8313463829e90a192feb7a58cf3698d430fa8d`
Documentation	Meetings and code comments
Documentation Assessment	High
Test Suite Assessment	High

2 Audited Files

	Contract	LoC	Comments	Ratio	Blank	Total
1	src/utils/utils.cairo	205	5	2.4%	19	229
2	src/utils/asserts.cairo	22	0	0.0%	5	27
3	src/sessions/utils.cairo	72	0	0.0%	8	80
4	src/sessions/interface.cairo	84	15	17.9%	14	113
5	src/sessions/sessions.cairo	345	45	13.0%	37	427
6	src/sessions/hash.cairo	97	3	3.1%	17	117
7	src/outside_execution/outside_execution.cairo	72	5	6.9%	10	87
	Total	**897**	**73**	**8.1%**	**110**	**1080**

3 Summary of Issues

	Finding	Severity	Update
1	Session time validity is rounded to the last hour	Low	Acknowledged
2	Deferred signer removal is applied inconsistently across different call flows	Info	Acknowledged
3	Execute calls that should be invalided by previous call that remove signers	Info	Acknowledged
4	Front-running the session with the large signature uses all session gas	Info	Fixed
5	Signature malleability	Info	Acknowledged
6	`CalldataValidation` struct definition should match its SNIP-12 typehash	Info	Acknowledged
7	Assert error for call hint validation should use `Errors::BAD_CALL_HINT`	Best Practices	Fixed
8	Unrestricted data in `allowed_method_calldata_validations`	Info	Acknowledged

4 System Overview

In this section, we describe the changes introduced to the current functionalities.

The **Outside Execution** module implements SNIP9. It allows wallet owner(s) to sign a transaction that later can be executed by a trusted third-party contract through additional entrypoint `execute_from_outside_v2(...)`. These transactions come with additional parameters specifying who can execute them and the valid time range in which they must be done. In the previous version, the `execute_from_outside_v2(...)` function checked if the calls were not performed to the account itself. However, the change in the current version modified the check to prevent only self-calls to the `execute_from_outside_v2(...)` function. This allows using `Outside Execution` call to perform important updates of the account from another address, which is especially useful in critical scenarios, e.g.:

- Account upgrade in case of breaking changes in the Starknet protocol that would block validate/execution flow
- Invalidate malicious session owner who performs DOS on account owner through front-run and using the nonce

The **Sessions** allow a wallet owner to give permission to another entity to execute particular transactions on the user's behalf. The sessions are limited to a certain time span and restricted to call only whitelisted functions. The session also has a spending limit and a gas limit (except for the gas-sponsored session). The current version introduced more granular checks that allow for the creation of a session that restricts a session calls' arguments. The session creator now can define not only which functions the session owner can call, but e.g., to which address. The calldata checks are currently limited to only `"equal"` check, but in the future more types of checks may be added.

The **Resource Bounds** in the `v3` transaction type on Starknet consisted of `l1_gas` and `l2_gas`. They define the gas limit that the transaction signer is willing to pay. However, the upcoming Starknet upgrade `0.13.4` adds a new resource bound `l1_data` to the `v3` transaction type. While this allows for a more granular gas spend definition, the accounts now must handle this new resource bound to execute `v3` transaction.

5 Risk Rating Methodology

The risk rating methodology used by Nethermind Security follows the principles established by the OWASP Foundation. The severity of each finding is determined by two factors: **Likelihood** and **Impact**.

Likelihood measures how likely the finding is to be uncovered and exploited by an attacker. This factor will be one of the following values:

a) **High**: The issue is trivial to exploit and has no specific conditions that need to be met;

b) **Medium**: The issue is moderately complex and may have some conditions that need to be met;

c) **Low**: The issue is very complex and requires very specific conditions to be met.

When defining the likelihood of a finding, other factors are also considered. These can include but are not limited to motive, opportunity, exploit accessibility, ease of discovery, and ease of exploit.

Impact is a measure of the damage that may be caused if an attacker exploits the finding. This factor will be one of the following values:

a) **High**: The issue can cause significant damage, such as loss of funds or the protocol entering an unrecoverable state;

b) **Medium**: The issue can cause moderate damage, such as impacts that only affect a small group of users or only a particular part of the protocol;

c) **Low**: The issue can cause little to no damage, such as bugs that are easily recoverable or cause unexpected interactions that cause minor inconveniences.

When defining the impact of a finding, other factors are also considered. These can include but are not limited to Data/state integrity, loss of availability, financial loss, and reputation damage. After defining the likelihood and impact of an issue, the severity can be determined according to the table below.

		Severity Risk		
Impact	**High**	Medium	High	Critical
	Medium	Low	Medium	High
	Low	Info/Best Practices	Low	Medium
	Undetermined	Undetermined	Undetermined	Undetermined
		Low	**Medium**	**High**
		Likelihood		

To address issues that do not fit a High/Medium/Low severity, Nethermind Security also uses three more finding severities: **Informational**, **Best Practices**, and **Undetermined**.

a) **Informational** findings do not pose any risk to the application, but they carry some information that the audit team intends to pass to the client formally;

b) **Best Practice** findings are used when some piece of code does not conform with smart contract development best practices;

c) **Undetermined** findings are used when we cannot predict the impact or likelihood of the issue.

6 Issues

6.1 [Low] Session time validity is rounded to the last hour

File(s): `braavos_account.cairo`

Description: When executing a session, its `execute_before` and `execute_after` fields are checked to ensure the session is being executed within a valid time window. This check is done within `__validate__`, however, according to the Starknet documentation the returned block timestamp during `__validate__` is rounded to the most recent hour, rather than a more accurate timestamp as would be expected during `__execute__`. This can cause sessions to expire up to almost an hour earlier than they should, and also prevent a session from being valid up until almost an hour after its `execute_before` has passed.

```
fn _validate_session_execute(...) -> felt252 {
    // ...
    // During validate the `timestamp` is rounded to most recent hour
    // May lead to inaccurate session time window validations
    assert_timestamp_2(
        session_execute_request.session_request.execute_after,
        session_execute_request.session_request.execute_before,
        timestamp
    );
    // ...
}
```

On sessions with a larger time window such as one week or one month, the effects may be negligible. However, for smaller time-frame sessions such as two hours, this rounding on time window validation may lead to a much shorter "actual" available time window.

Recommendation(s): Consider moving the session expiration check to the `__execute__` to get the precise timestamp. Alternatively, document this behavior so that the sessions creators are aware of this behavior.

Status: Acknowledged

Update from the client: We acknowledge this issue and will communicate this limitation to dApps.

6.2 [Info] Deferred signer removal is applied inconsistently across different call flows

File(s): `presets/braavos_account.cairo`

Description: Deferred signer removals occur during the `__validate__`/`__execute__` flow, but any other way to initiate calls on the Braavos account does not. The following is a breakdown of which approach will handle deferred removals:

```
Weak signer:            Yes
Strong signer:          Yes
MOA:                    Yes
Session:                Yes
Gas sponsored session:  No
Outside execution:      No
```

There may be cases where a to-be-removed strong signer had previously signed an Outside Execution or Gas Sponsored Session before access to the strong signer had been lost. Once the wait time has passed and the strong signer would normally be removed from the account, any interactions through OE or sessions will continue to treat the strong signer as valid since these flows don't trigger deferred signer removal. This doesn't pose a security risk, as deferred signer removal is in place to handle lost strong signer keys rather than malicious signers, but the inconsistency in signer removal depending on transaction/call flows can cause signatures that would normally be considered invalid after the deferred wait period to be still considered as valid.

Recommendation(s): Consider unifying the deferred removal for sessions.

Status: Acknowledged

Update from the client: We ackownledge the issue and will consider this change later on to make the etd removal more consistent.

6.3 [Info] Execute calls that should be invalided by previous call that remove signers

File(s): `braavos_account.cairo`

Description: The `OutsideExecution` in the current version allows the call to the wallet itself. This allows for scenarios where the first call performs critical actions like 1) removal of a signer or 2) contract upgrade. In the first case, the next calls will be executed, even if the `pubkey` that signed those transactions is not a valid signer. In the case 2) the next call may be incorrect since the interface or functionality after upgrade could change.

Recommendation(s): Consider ensuring that in `OutsideExecution` the important calls like removing signer or upgrade are not batched with other calls.

Status: Acknowledged

Update from the client: Acknowledged, regarding scenario (1) - we think it is reasonable to execute transactions signed by the user even if the signer changes in that multicall. This issue will be mitigated by the wallet, similar to regular transactions that pose a similar issue.

6.4 [Info] Front-running the session with the large signature uses all session gas

File(s): `session.cairo`

Description: When processing signatures, there should be a check to ensure that the length of the signature is not excessive. Some signature validations in the Braavos account are done by assuming that the signature is a Stark signature (where the length would be `2` and directly grabbing the first and second elements of a signature span, without checking for the presence of any additional elements. This poses a potential risk to the wallet or session owners as they may post a transaction providing valid signature data, and a malicious actor could extract the two valid elements of the signature, add additional data to inflate the signature size and then frontrun the user's transaction. When the transaction is executed, the two valid signature elements will be parsed and the signature will be valid, with the additional data ignored. Since signature data incurs a gas cost based on its size, the malicious actor could significantly increase the gas cost of the transaction. Currently there are existing checks in some parts, but the `__validate_session_execute(...)` is still vulnerable to this potential attack where malicious actor frontruns inflates gas costs invalidating session execution

```
assert(session_stark_owner.validate_signature(hash, signature), Errors::INVALID_SIG);
```

Recommendation(s): Consider ensuring in `_validate_session_execute(...)` that the length of stark signature is `2`.

Status: Fixed

6.5 [Info] Signature malleability

File(s): `signers.cairo`

Description: The ECDSA verification functions `is_valid_signature(...)` and `check_ecdsa_signature(...)` do not check if the `s` part of signature is in the lower part of the curve (Secp256r1 and Stark). This allows for providing two different signatures for the same data, by modifying the `s` value. Additionaly the `check_ecdsa_signature(...)` does not ensure that the `s` value is a point on a Stark curve.

Recommendation(s): Consider restricting the `s` to be less than half the size of the curve. This check would also ensure that the `s` is a point on a Stark curve in `check_ecdsa_signature(...)`.

Status: Acknowledged

Update from the client: Acknowledged, we will address this in future versions.

6.6 [Info] `CalldataValidation` struct definition should match its SNIP-12 typehash

File(s): `sessions/interface.cairo`

Description: The typehash `CALLDATA_VALIDATION_TYPE_HASH` describes the `offset` field as being of type `u128` while the struct definition states it is a `u32`, as shown below:

```
// Struct definition
struct CalldataValidation {
    validation_type: CalldataValidationType,
    offset: u32,
    value: felt252,
}

// Typehash definition
const CALLDATA_VALIDATION_TYPE_HASH: felt252 = selector!(
    "\"CalldataValidation\"(\"Offset\":\"u128\",\"Value\":\"felt\",\"Validation Type\":\"u128\")",
);
```

A constraint of the SNIP-12 specification is that it doesn't support unsigned integer types smaller than `u128`. An inconsistency between the data structure and the typehash should be avoided where possible. The string used for the `CALLDATA_VALIDATION_TYPE_HASH` is also used in the following different typehashes:

```
ALLOWED_METHOD_TYPE_HASH_V2
GAS_SPONSORED_SESSION_EXECUTION_TYPE_HASH_V2
SESSION_EXECUTION_TYPE_HASH_V2
```

Recommendation(s): Consider changing the `offset` field in the `CalldataValidation` struct to be of type `u128` to make the struct consistent with its typehash.

Status: Acknowledged

Update from the client: The span `.at` function expects a `u32` value which is the reason for the discrepensy. Instead of using a `u128` type for this field and converting it into a `u32` before accessing the span, we use Cairo's desieralization to fail on irrelevant values.

6.7 [Best Practices] Assert error for call hint validation should use `Errors::BAD_CALL_HINT`

File(s): `sessions/utils.cairo`

Description: In the function `validate_allowed_methods`, the `calls_hint` span contains indexes pointing to a specific calldata validation to check. For each call hint, a check is done to ensure that the index does not exceed the length of the `allowed_method_guids` span, as shown below. The error used is `BAD_CALL`, however, since this validation is applied to call hint related data, the error `BAD_CALL_HINT` would be more appropriate.

```
fn validate_allowed_methods(...) {
    // ...
    loop {
        // ...
        let call_index = *calls_hint.at(index);
        assert(call_index < allowed_method_guids.len(), Errors::BAD_CALL);
        // ...
    };
}
```

Recommendation(s): Consider changing the call index validation error from `BAD_CALL` to `BAD_CALL_HINT`.

Status: Fixed

6.8 [Info] Unrestricted data in `allowed_method_calldata_validations`

File(s): `sessions.cairo`

Description: The `allowed_method_calldata_validations` contains data that is used to validate the session calls' calladata. The `allowed_method_calldata_validations` is restricted to be the same length as `allowed_method_guids`, and each element of `allowed_method_calldata_validations` that is used in validation must be part of `allowed_method_guids`. However, the unused elements of `allowed_method_calldata_validations` are not checked to be in `allowed_method_guids`, and it is also not part of the session hash. Therefore, the user can provide any data there. This does not pose any security risk; however, it should be considered if this data were to be used during the changes in the protocol.

Recommendation(s): Consider checking if the unused elements in `allowed_method_calldata_validations` are empty.

Status: Acknowledged

Update from the client: Acknowledged, at the moment these are used as hints but we will take this under consideration in future changes.

7 Documentation Evaluation

Software documentation refers to the written or visual information that describes the functionality, architecture, design, and implementation of software. It provides a comprehensive overview of the software system and helps users, developers, and stakeholders understand how the software works, how to use it, and how to maintain it. Software documentation can take different forms, such as user manuals, system manuals, technical specifications, requirements documents, design documents, and code comments. Software documentation is critical in software development, enabling effective communication between developers, testers, users, and other stakeholders. It helps to ensure that everyone involved in the development process has a shared understanding of the software system and its functionality. Moreover, software documentation can improve software maintenance by providing a clear and complete understanding of the software system, making it easier for developers to maintain, modify, and update the software over time. Smart contracts can use various types of software documentation. Some of the most common types include:

- Technical whitepaper: A technical whitepaper is a comprehensive document describing the smart contract's design and technical details. It includes information about the purpose of the contract, its architecture, its components, and how they interact with each other;
- User manual: A user manual is a document that provides information about how to use the smart contract. It includes step-by-step instructions on how to perform various tasks and explains the different features and functionalities of the contract;
- Code documentation: Code documentation is a document that provides details about the code of the smart contract. It includes information about the functions, variables, and classes used in the code, as well as explanations of how they work;
- API documentation: API documentation is a document that provides information about the API (Application Programming Interface) of the smart contract. It includes details about the methods, parameters, and responses that can be used to interact with the contract;
- Testing documentation: Testing documentation is a document that provides information about how the smart contract was tested. It includes details about the test cases that were used, the results of the tests, and any issues that were identified during testing;
- Audit documentation: Audit documentation includes reports, notes, and other materials related to the security audit of the smart contract. This type of documentation is critical in ensuring that the smart contract is secure and free from vulnerabilities.

These types of documentation are essential for smart contract development and maintenance. They help ensure that the contract is properly designed, implemented, and tested, and they provide a reference for developers who need to modify or maintain the contract in the future.

Remarks about the Braavos documentation

The documentation for the Braavos Account was provided during kick-off meeting. Moreover, the Braavos team addressed all questions and concerns raised by the Nethermind Security team, providing valuable insights and a comprehensive understanding of the project's technical aspects.

8 Test Suite Evaluation

8.1 Compilation Output

```
$ scarb build
   Compiling braavos_account v1.0.1
    Finished `dev` profile target(s) in 10 seconds
```

8.2 Tests Output

```
test_get_required_signer PASSED
test_webauthn_chromium_examples[test_case_1] PASSED
test_webauthn_chromium_examples[test_case_2_additional_fields_in_cdata] PASSED
test_external_entrypoints_assert_self PASSED
test_set_execution_time_delay PASSED
test_outside_execution[no_second_signer_no_multisig] PASSED
test_outside_execution[with_secp256r1_no_multisig] PASSED
test_outside_execution[with_secp256r1_multisig] PASSED
test_outside_execution[with_webauthn_no_multisig] PASSED
test_outside_execution[with_webauthn_multisig] PASSED
test_outside_execution_interface PASSED
test_outside_execution_with_invalid_params[execute_time_in_future] PASSED
test_outside_execution_with_invalid_params[execute_time_in_past] PASSED
test_outside_execution_with_invalid_params[different_caller] PASSED
test_outside_execution_nonce_reuse PASSED
test_outside_execution_empty_sig PASSED
test_outside_execution_invalid_sig PASSED
test_outside_execution_illegal_self_calls_blocked[execute_gas_sponsored_session_tx-SELF_CALL] PASSED
test_outside_execution_illegal_self_calls_blocked[execute_gas_sponsored_session_tx_v2-SELF_CALL] PASSED
test_outside_execution_illegal_self_calls_blocked[execute_from_outside_v2-SELF_CALL] PASSED
test_outside_execution_illegal_self_calls_blocked[__execute__-NO_REENTRANCE] PASSED
test_outside_execution_illegal_self_calls_blocked[__validate__-NO_REENTRANCE] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_version-calldata0] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_withdrawal_limit_low-calldata1] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_withdrawal_limit_high-calldata2] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_daily_spend-calldata3] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_fee_token_rate-calldata4] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_stark_fee_token_rate-calldata5] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_public_key-calldata6] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_signers-calldata7] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_deferred_remove_signers-calldata8] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_execution_time_delay-calldata9] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_multisig_threshold-calldata10] PASSED
test_outside_execution_legal_read_self_calls_allowed[supports_interface-calldata11] PASSED
test_outside_execution_legal_read_self_calls_allowed[supportsInterface-calldata12] PASSED
test_outside_execution_legal_read_self_calls_allowed[is_valid_outside_execution_nonce-calldata13] PASSED
test_outside_execution_legal_read_self_calls_allowed[is_session_revoked-calldata14] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_spending_limit_amount_spent-calldata15] PASSED
test_outside_execution_legal_read_self_calls_allowed[is_session_validated-calldata16] PASSED
test_outside_execution_legal_read_self_calls_allowed[get_session_gas_spent-calldata17] PASSED
test_outside_execution_is_valid_signature_allowed PASSED
test_outside_execution_legal_self_calls_allowed PASSED
test_deployment[basic_stark_signer] PASSED
test_deployment[with_secp256r1_no_multisig] PASSED
test_deployment[with_secp256r1_multisig] PASSED
test_deployment[with_webauthn_no_multisig] PASSED
test_deployment[with_webauthn_multisig] PASSED
test_deployment[with_secp256r1_no_multisig_with_thresh] PASSED
test_deployment[with_secp256r1_multisig_with_thresh] PASSED
test_deployment[with_webauthn_secp256r1_no_multisig_with_thresh] PASSED
test_deployment[with_webauthn_secp256r1_multisig_with_thresh] PASSED
test_deployment[basic_stark_signer_v3_deployment] PASSED
test_deployment[with_secp256r1_no_multisig_v3_deployment] PASSED
test_deployment[with_secp256r1_multisig_v3_deployment] PASSED
test_deployment[with_webauthn_no_multisig_v3_deployment] PASSED
test_deployment[with_webauthn_multisig_v3_deployment] PASSED
test_deployment[with_secp256r1_no_multisig_with_thresh_v3_deployment] PASSED
test_deployment[with_secp256r1_multisig_with_thresh_v3_deployment] PASSED
test_deployment[with_webauthn_secp256r1_no_multisig_with_thresh_v3_deployment] PASSED
test_deployment[with_webauthn_secp256r1_multisig_with_thresh_v3_deployment] PASSED
test_deployment_from_UDC PASSED
test_deployment_from_factory[None-False-0-0-0-True] PASSED
test_deployment_from_factory[None-False-0-0-0-False] PASSED
test_deployment_from_factory[secp256r1_keypair1-False-2-0-0-True] PASSED
test_deployment_from_factory[secp256r1_keypair1-False-2-0-0-False] PASSED
test_deployment_from_factory[secp256r1_keypair2-True-2-0-0-True] PASSED
test_deployment_from_factory[secp256r1_keypair2-True-2-0-0-False] PASSED
test_deployment_from_factory[secp256r1_keypair3-False-0-0-0-True] PASSED
test_deployment_from_factory[secp256r1_keypair3-False-0-0-0-False] PASSED
test_deployment_from_factory[secp256r1_keypair4-True-0-0-0-True] PASSED
test_deployment_from_factory[secp256r1_keypair4-True-0-0-0-False] PASSED
test_deployment_from_factory[secp256r1_keypair5-False-0-50000000-100000000-True] PASSED
test_deployment_from_factory[secp256r1_keypair5-False-0-50000000-100000000-False] PASSED
test_deployment_from_factory[secp256r1_keypair6-True-0-50000000-100000000-True] PASSED
test_deployment_from_factory[secp256r1_keypair6-True-0-50000000-100000000-False] PASSED
test_deployment_from_factory[secp256r1_keypair7-False-2-50000000-100000000-True] PASSED
test_deployment_from_factory[secp256r1_keypair7-False-2-50000000-100000000-False] PASSED
test_deployment_from_factory[secp256r1_keypair8-True-2-50000000-100000000-True] PASSED
test_deployment_from_factory[secp256r1_keypair8-True-2-50000000-100000000-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[None-False-0-0-0-True-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[None-False-0-0-0-True-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[None-False-0-0-0-False-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[None-False-0-0-0-False-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair1-False-2-0-0-True-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair1-False-2-0-0-True-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair1-False-2-0-0-False-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair1-False-2-0-0-False-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair2-True-2-0-0-True-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair2-True-2-0-0-True-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair2-True-2-0-0-False-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair2-True-2-0-0-False-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair3-False-0-0-0-True-True] PASSED
```

```
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair3-False-0-0-0-True-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair3-False-0-0-0-False-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair3-False-0-0-0-False-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair4-True-0-0-0-True-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair4-True-0-0-0-True-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair4-True-0-0-0-False-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair4-True-0-0-0-False-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair5-False-0-50000000-100000000-True-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair5-False-0-50000000-100000000-True-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair5-False-0-50000000-100000000-False-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair5-False-0-50000000-100000000-False-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair6-True-0-50000000-100000000-True-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair6-True-0-50000000-100000000-True-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair6-True-0-50000000-100000000-False-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair6-True-0-50000000-100000000-False-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair7-False-2-50000000-100000000-True-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair7-False-2-50000000-100000000-True-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair7-False-2-50000000-100000000-False-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair7-False-2-50000000-100000000-False-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair8-True-2-50000000-100000000-True-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair8-True-2-50000000-100000000-True-False] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair8-True-2-50000000-100000000-False-True] PASSED
test_deployment_from_malicious_factory_and_init_from_account[secp256r1_keypair8-True-2-50000000-100000000-False-False] PASSED
test_upgrade[src6_supported] PASSED
test_upgrade[src6_not_supported] PASSED
test_invalid_account_deployment[stark_pub_key_is_0] PASSED
test_invalid_account_deployment[basic_stark_wrong_sig] PASSED
test_invalid_account_deployment[basic_stark_rs_zero_sig] PASSED
test_invalid_account_deployment[multisig_1_with_only_stark] PASSED
test_invalid_account_deployment[multisig_2_with_only_stark] PASSED
test_invalid_account_deployment[multisig_1_with_secp256r1] PASSED
test_invalid_account_deployment[multisig_3_with_secp256r1] PASSED
test_invalid_account_deployment[multisig_1_with_secp256r1_webauthn] PASSED
test_invalid_account_deployment[multisig_3_with_secp256r1_webauthn] PASSED
test_invalid_account_deployment[invalid_secp256r1_pubk] PASSED
test_invalid_account_deployment[invalid_secp256r1_pubk_x] PASSED
test_invalid_account_deployment[invalid_secp256r1_pubk_y] PASSED
test_invalid_account_deployment[invalid_secp256r1_pubk_webauthn] PASSED
test_invalid_account_deployment[invalid_secp256r1_pubk_x_webauthn] PASSED
test_invalid_account_deployment[invalid_secp256r1_pubk_y_webauthn] PASSED
test_invalid_account_deployment[low_withdrawal_limit_set_with_only_stark] PASSED
test_invalid_account_deployment[low_withdrawal_limit_set_without_fee_rate] PASSED
test_fail_initializer_after_deployment PASSED
test_add_secp256r1_signer[with_secp256r1_no_multisig] PASSED
test_add_secp256r1_signer[with_secp256r1_multisig] PASSED
test_add_secp256r1_signer[with_secp256r1_and_webauthn_no_multisig] PASSED
test_add_secp256r1_signer[with_secp256r1_and_webauthn_multisig] PASSED
test_add_webauthn_signer[with_webauthn_no_multisig] PASSED
test_add_webauthn_signer[with_webauthn_and_hws_no_multisig] PASSED
test_add_webauthn_signer[with_webauthn_multisig] PASSED
test_add_webauthn_signer[with_webauthn_and_hws_multisig] PASSED
test_remove_secp256r1_signer[with_secp256r1_no_multisig] PASSED
test_remove_secp256r1_signer[with_secp256r1_multisig] PASSED
test_remove_secp256r1_signer[with_secp256r1_no_multisig_with_webauthn] PASSED
test_remove_secp256r1_signer[with_secp256r1_multisig_with_webauthn] PASSED
test_remove_secp256r1_signer[with_secp256r1_no_multisig_with_thresh] PASSED
test_remove_secp256r1_signer[with_secp256r1_multisig_with_thresh] PASSED
test_remove_secp256r1_signer[with_secp256r1_no_multisig_with_webauthn_with_thresh] PASSED
test_remove_secp256r1_signer[with_secp256r1_multisig_with_webauthn_with_thresh] PASSED
test_remove_webauthn_signer[with_webauthn_no_multisig] PASSED
test_remove_webauthn_signer[with_webauthn_multisig] PASSED
test_remove_webauthn_signer[with_webauthn_no_multisig_with_hws] PASSED
test_remove_webauthn_signer[with_webauthn_multisig_with_hws] PASSED
test_change_secp256r1_signer[with_secp256r1_no_multisig] PASSED
test_change_secp256r1_signer[with_secp256r1_multisig] PASSED
test_change_weauthn_signer[with_webauthn_no_multisig] PASSED
test_change_weauthn_signer[with_webauthn_multisig] PASSED
test_add_secp256r1_signer_m_of_n[threshold_2_signers_2_secp256r1] PASSED
test_add_secp256r1_signer_m_of_n[threshold_2_signers_3_secp256r1] PASSED
test_add_secp256r1_signer_m_of_n[threshold_3_signers_3_secp256r1] PASSED
test_add_secp256r1_signer_m_of_n[threshold_2_signers_4_secp256r1] PASSED
test_add_secp256r1_signer_m_of_n[threshold_3_signers_4_secp256r1] PASSED
test_add_secp256r1_signer_m_of_n[threshold_4_signers_4_secp256r1] PASSED
test_add_secp256r1_signer_m_of_n[threshold_5_signers_10_secp256r1] PASSED
test_add_secp256r1_signer_m_of_n[threshold_2_signers_2_webauthn] PASSED
test_add_secp256r1_signer_m_of_n[threshold_2_signers_3_webauthn] PASSED
test_add_secp256r1_signer_m_of_n[threshold_3_signers_3_webauthn] PASSED
test_add_secp256r1_signer_m_of_n[threshold_2_signers_4_webauthn] PASSED
test_add_secp256r1_signer_m_of_n[threshold_3_signers_4_webauthn] PASSED
test_add_secp256r1_signer_m_of_n[threshold_4_signers_4_webauthn] PASSED
test_add_secp256r1_signer_m_of_n[threshold_5_signers_10_webauthn] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_2_signers_2_s_w] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_2_signers_2_w_s] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_2_signers_3_s_w_w] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_2_signers_3_w_s_s] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_3_signers_3_s_w_w] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_3_signers_3_w_s_s] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_3_signers_5_s_w_w_s_s] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_3_signers_5_w_s_s_w_w] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_4_signers_5_s_w_w_s_s] PASSED
test_secp256r1_and_webauthn_signers_m_of_n[threshold_4_signers_5_w_s_s_w_w] PASSED
test_multiple_secp256r1_signers[with_secp256r1_no_multisig] PASSED
test_multiple_secp256r1_signers[with_secp256r1_multisig] PASSED
test_multiple_secp256r1_signers[with_webauthn_secp256r1_no_multisig] PASSED
test_multiple_secp256r1_signers[with_webauthn_secp256r1_multisig] PASSED
test_regenesis_upgrade[basic_stark] PASSED
test_regenesis_upgrade[with_secp256r1_no_multisig] PASSED
test_regenesis_upgrade[with_secp256r1_no_multisig_move_idx] PASSED
test_regenesis_upgrade[with_secp256r1_multisig] PASSED
test_multiple_secp256r1_signers_with_signer_change[with_secp256r1_no_multisig] PASSED
test_multiple_secp256r1_signers_with_signer_change[with_secp256r1_multisig] PASSED
test_multiple_secp256r1_signers_with_signer_change[with_webauthn_secp256r1_no_multisig] PASSED
test_multiple_secp256r1_signers_with_signer_change[with_webauthn_secp256r1_multisig] PASSED
test_multiple_hws_and_webauthn_signers_with_signer_change[multisig] PASSED
test_multiple_hws_and_webauthn_signers_with_signer_change[no_multisig] PASSED
test_duplicate_signers_cause_error[webauthn] PASSED
test_duplicate_signers_cause_error[not_webauthn] PASSED
test_deferred_remove_secp256r1_signer[with_secp256r1_no_multisig_custom_time_delay] PASSED
test_deferred_remove_secp256r1_signer[with_secp256r1_multisig] PASSED
test_deferred_remove_secp256r1_signer[with_webauthn_secp256r1_no_multisig] PASSED
test_deferred_remove_secp256r1_signer[with_webauthn_secp256r1_multisig] PASSED
test_deferred_remove_secp256r1_signer[with_secp256r1_no_multisig_with_thresh] PASSED
test_deferred_remove_secp256r1_signer[with_secp256r1_multisig_with_thresh] PASSED
test_deferred_remove_secp256r1_signer[with_webauthn_secp256r1_no_multisig_with_thresh] PASSED
test_deferred_remove_secp256r1_signer[with_webauthn_secp256r1_multisig_with_thresh] PASSED
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test_deferred_remove_all_signers[no_multisig] PASSED
test_deferred_remove_all_signers[multisig] PASSED
test_cancel_deferred_remove_secp256r1_signer[with_secp256r1_no_multisig] PASSED
test_cancel_deferred_remove_secp256r1_signer[with_secp256r1_multisig] PASSED
test_cancel_deferred_remove_secp256r1_signer[with_webauthn_secp256r1_no_multisig] PASSED
test_cancel_deferred_remove_secp256r1_signer[with_webauthn_secp256r1_multisig] PASSED
test_session_execution[False-True-True-no_second_signer_no_multisig] PASSED
test_session_execution[False-True-True-with_secp256r1_no_multisig] PASSED
test_session_execution[False-True-True-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution[False-True-True-with_secp256r1_multisig] PASSED
test_session_execution[False-True-True-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution[False-True-True-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution[False-True-True-with_webauthn_no_multisig] PASSED
test_session_execution[False-True-True-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution[False-True-True-with_webauthn_multisig] PASSED
test_session_execution[False-True-True-with_webauthn_multisig_dwl_low] PASSED
test_session_execution[False-True-True-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution[False-True-False-no_second_signer_no_multisig] PASSED
test_session_execution[False-True-False-with_secp256r1_no_multisig] PASSED
test_session_execution[False-True-False-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution[False-True-False-with_secp256r1_multisig] PASSED
test_session_execution[False-True-False-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution[False-True-False-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution[False-True-False-with_webauthn_no_multisig] PASSED
test_session_execution[False-True-False-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution[False-True-False-with_webauthn_multisig] PASSED
test_session_execution[False-True-False-with_webauthn_multisig_dwl_low] PASSED
test_session_execution[False-True-False-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution[False-False-True-no_second_signer_no_multisig] PASSED
test_session_execution[False-False-True-with_secp256r1_no_multisig] PASSED
test_session_execution[False-False-True-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution[False-False-True-with_secp256r1_multisig] PASSED
test_session_execution[False-False-True-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution[False-False-True-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution[False-False-True-with_webauthn_no_multisig] PASSED
test_session_execution[False-False-True-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution[False-False-True-with_webauthn_multisig] PASSED
test_session_execution[False-False-True-with_webauthn_multisig_dwl_low] PASSED
test_session_execution[False-False-True-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution[False-False-False-no_second_signer_no_multisig] PASSED
test_session_execution[False-False-False-with_secp256r1_no_multisig] PASSED
test_session_execution[False-False-False-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution[False-False-False-with_secp256r1_multisig] PASSED
test_session_execution[False-False-False-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution[False-False-False-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution[False-False-False-with_webauthn_no_multisig] PASSED
test_session_execution[False-False-False-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution[False-False-False-with_webauthn_multisig] PASSED
test_session_execution[False-False-False-with_webauthn_multisig_dwl_low] PASSED
test_session_execution[False-False-False-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution[True-True-True-no_second_signer_no_multisig] PASSED
test_session_execution[True-True-True-with_secp256r1_no_multisig] PASSED
test_session_execution[True-True-True-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution[True-True-True-with_secp256r1_multisig] PASSED
test_session_execution[True-True-True-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution[True-True-True-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution[True-True-True-with_webauthn_no_multisig] PASSED
test_session_execution[True-True-True-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution[True-True-True-with_webauthn_multisig] PASSED
test_session_execution[True-True-True-with_webauthn_multisig_dwl_low] PASSED
test_session_execution[True-True-True-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution[True-True-False-no_second_signer_no_multisig] PASSED
test_session_execution[True-True-False-with_secp256r1_no_multisig] PASSED
test_session_execution[True-True-False-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution[True-True-False-with_secp256r1_multisig] PASSED
test_session_execution[True-True-False-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution[True-True-False-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution[True-True-False-with_webauthn_no_multisig] PASSED
test_session_execution[True-True-False-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution[True-True-False-with_webauthn_multisig] PASSED
test_session_execution[True-True-False-with_webauthn_multisig_dwl_low] PASSED
test_session_execution[True-True-False-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution[True-False-True-no_second_signer_no_multisig] PASSED
test_session_execution[True-False-True-with_secp256r1_no_multisig] PASSED
test_session_execution[True-False-True-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution[True-False-True-with_secp256r1_multisig] PASSED
test_session_execution[True-False-True-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution[True-False-True-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution[True-False-True-with_webauthn_no_multisig] PASSED
test_session_execution[True-False-True-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution[True-False-True-with_webauthn_multisig] PASSED
test_session_execution[True-False-True-with_webauthn_multisig_dwl_low] PASSED
test_session_execution[True-False-True-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution[True-False-False-no_second_signer_no_multisig] PASSED
test_session_execution[True-False-False-with_secp256r1_no_multisig] PASSED
test_session_execution[True-False-False-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution[True-False-False-with_secp256r1_multisig] PASSED
test_session_execution[True-False-False-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution[True-False-False-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution[True-False-False-with_webauthn_no_multisig] PASSED
test_session_execution[True-False-False-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution[True-False-False-with_webauthn_multisig] PASSED
test_session_execution[True-False-False-with_webauthn_multisig_dwl_low] PASSED
test_session_execution[True-False-False-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution_with_bad_calldata[True-True-no_second_signer_no_multisig] PASSED
test_session_execution_with_bad_calldata[True-True-with_secp256r1_no_multisig] PASSED
test_session_execution_with_bad_calldata[True-True-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[True-True-with_secp256r1_multisig] PASSED
test_session_execution_with_bad_calldata[True-True-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[True-True-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution_with_bad_calldata[True-True-with_webauthn_no_multisig] PASSED
test_session_execution_with_bad_calldata[True-True-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[True-True-with_webauthn_multisig] PASSED
test_session_execution_with_bad_calldata[True-True-with_webauthn_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[True-True-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution_with_bad_calldata[True-False-no_second_signer_no_multisig] PASSED
test_session_execution_with_bad_calldata[True-False-with_secp256r1_no_multisig] PASSED
test_session_execution_with_bad_calldata[True-False-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[True-False-with_secp256r1_multisig] PASSED
test_session_execution_with_bad_calldata[True-False-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[True-False-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution_with_bad_calldata[True-False-with_webauthn_no_multisig] PASSED
test_session_execution_with_bad_calldata[True-False-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[True-False-with_webauthn_multisig] PASSED
```

```
test_session_execution_with_bad_calldata[True-False-with_webauthn_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[True-False-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution_with_bad_calldata[False-True-no_second_signer_no_multisig] PASSED
test_session_execution_with_bad_calldata[False-True-with_secp256r1_no_multisig] PASSED
test_session_execution_with_bad_calldata[False-True-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[False-True-with_secp256r1_multisig] PASSED
test_session_execution_with_bad_calldata[False-True-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[False-True-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution_with_bad_calldata[False-True-with_webauthn_no_multisig] PASSED
test_session_execution_with_bad_calldata[False-True-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[False-True-with_webauthn_multisig] PASSED
test_session_execution_with_bad_calldata[False-True-with_webauthn_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[False-True-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution_with_bad_calldata[False-False-no_second_signer_no_multisig] PASSED
test_session_execution_with_bad_calldata[False-False-with_secp256r1_no_multisig] PASSED
test_session_execution_with_bad_calldata[False-False-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[False-False-with_secp256r1_multisig] PASSED
test_session_execution_with_bad_calldata[False-False-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[False-False-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution_with_bad_calldata[False-False-with_webauthn_no_multisig] PASSED
test_session_execution_with_bad_calldata[False-False-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[False-False-with_webauthn_multisig] PASSED
test_session_execution_with_bad_calldata[False-False-with_webauthn_multisig_dwl_low] PASSED
test_session_execution_with_bad_calldata[False-False-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution_with_multiple_call_validations_on_same_method[True-True] PASSED
test_session_execution_with_multiple_call_validations_on_same_method[True-False] PASSED
test_session_execution_with_multiple_call_validations_on_same_method[False-True] PASSED
test_session_execution_with_multiple_call_validations_on_same_method[False-False] PASSED
test_session_cache_invalidation_when_signer_added[False-False-True-2] PASSED
test_session_cache_invalidation_when_signer_added[False-False-True-5] PASSED
test_session_cache_invalidation_when_signer_added[False-True-False-2] PASSED
test_session_cache_invalidation_when_signer_added[False-True-False-5] PASSED
test_session_cache_invalidation_when_signer_added[False-True-True-2] PASSED
test_session_cache_invalidation_when_signer_added[False-True-True-5] PASSED
test_session_cache_invalidation_when_signer_added[True-False-True-2] PASSED
test_session_cache_invalidation_when_signer_added[True-False-True-5] PASSED
test_session_cache_invalidation_when_signer_added[True-True-False-2] PASSED
test_session_cache_invalidation_when_signer_added[True-True-False-5] PASSED
test_session_cache_invalidation_when_signer_added[True-True-True-2] PASSED
test_session_cache_invalidation_when_signer_added[True-True-True-5] PASSED
test_session_cache_invalidation_when_signer_removed[False-False-True-2] PASSED
test_session_cache_invalidation_when_signer_removed[False-False-True-5] PASSED
test_session_cache_invalidation_when_signer_removed[False-True-False-2] PASSED
test_session_cache_invalidation_when_signer_removed[False-True-False-5] PASSED
test_session_cache_invalidation_when_signer_removed[False-True-True-2] PASSED
test_session_cache_invalidation_when_signer_removed[False-True-True-5] PASSED
test_session_cache_invalidation_when_signer_removed[True-False-True-2] PASSED
test_session_cache_invalidation_when_signer_removed[True-False-True-5] PASSED
test_session_cache_invalidation_when_signer_removed[True-True-False-2] PASSED
test_session_cache_invalidation_when_signer_removed[True-True-False-5] PASSED
test_session_cache_invalidation_when_signer_removed[True-True-True-2] PASSED
test_session_cache_invalidation_when_signer_removed[True-True-True-5] PASSED
test_session_cache_invalidation_when_multisig_changes[False-False-True-0] PASSED
test_session_cache_invalidation_when_multisig_changes[False-False-True-2] PASSED
test_session_cache_invalidation_when_multisig_changes[False-True-False-0] PASSED
test_session_cache_invalidation_when_multisig_changes[False-True-False-2] PASSED
test_session_cache_invalidation_when_multisig_changes[False-True-True-0] PASSED
test_session_cache_invalidation_when_multisig_changes[False-True-True-2] PASSED
test_session_cache_invalidation_when_multisig_changes[True-False-True-0] PASSED
test_session_cache_invalidation_when_multisig_changes[True-False-True-2] PASSED
test_session_cache_invalidation_when_multisig_changes[True-True-False-0] PASSED
test_session_cache_invalidation_when_multisig_changes[True-True-False-2] PASSED
test_session_cache_invalidation_when_multisig_changes[True-True-True-0] PASSED
test_session_cache_invalidation_when_multisig_changes[True-True-True-2] PASSED
test_session_execution_with_etd_present[False-with_secp256r1_no_multisig] PASSED
test_session_execution_with_etd_present[False-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution_with_etd_present[False-with_secp256r1_multisig] PASSED
test_session_execution_with_etd_present[False-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution_with_etd_present[False-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution_with_etd_present[False-with_webauthn_no_multisig] PASSED
test_session_execution_with_etd_present[False-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution_with_etd_present[False-with_webauthn_multisig] PASSED
test_session_execution_with_etd_present[False-with_webauthn_multisig_dwl_low] PASSED
test_session_execution_with_etd_present[False-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution_with_etd_present[True-with_secp256r1_no_multisig] PASSED
test_session_execution_with_etd_present[True-with_secp256r1_no_multisig_dwl_low] PASSED
test_session_execution_with_etd_present[True-with_secp256r1_multisig] PASSED
test_session_execution_with_etd_present[True-with_secp256r1_multisig_dwl_low] PASSED
test_session_execution_with_etd_present[True-with_secp256r1_multisig_dwl_low_high] PASSED
test_session_execution_with_etd_present[True-with_webauthn_no_multisig] PASSED
test_session_execution_with_etd_present[True-with_webauthn_no_multisig_dwl_low] PASSED
test_session_execution_with_etd_present[True-with_webauthn_multisig] PASSED
test_session_execution_with_etd_present[True-with_webauthn_multisig_dwl_low] PASSED
test_session_execution_with_etd_present[True-with_webauthn_multisig_dwl_low_high] PASSED
test_session_execution_revoke[False-False-True-no_second_signer_no_multisig-False] PASSED
test_session_execution_revoke[False-False-True-no_second_signer_no_multisig-True] PASSED
test_session_execution_revoke[False-False-True-with_secp256r1_no_multisig-False] PASSED
test_session_execution_revoke[False-False-True-with_secp256r1_no_multisig-True] PASSED
test_session_execution_revoke[False-False-True-with_secp256r1_multisig-False] PASSED
test_session_execution_revoke[False-False-True-with_secp256r1_multisig-True] PASSED
test_session_execution_revoke[False-False-True-with_webauthn_no_multisig-False] PASSED
test_session_execution_revoke[False-False-True-with_webauthn_no_multisig-True] PASSED
test_session_execution_revoke[False-False-True-with_webauthn_multisig-False] PASSED
test_session_execution_revoke[False-False-True-with_webauthn_multisig-True] PASSED
test_session_execution_revoke[False-True-False-no_second_signer_no_multisig-False] PASSED
test_session_execution_revoke[False-True-False-no_second_signer_no_multisig-True] PASSED
test_session_execution_revoke[False-True-False-with_secp256r1_no_multisig-False] PASSED
test_session_execution_revoke[False-True-False-with_secp256r1_no_multisig-True] PASSED
test_session_execution_revoke[False-True-False-with_secp256r1_multisig-False] PASSED
test_session_execution_revoke[False-True-False-with_secp256r1_multisig-True] PASSED
test_session_execution_revoke[False-True-False-with_webauthn_no_multisig-False] PASSED
test_session_execution_revoke[False-True-False-with_webauthn_no_multisig-True] PASSED
test_session_execution_revoke[False-True-False-with_webauthn_multisig-False] PASSED
test_session_execution_revoke[False-True-False-with_webauthn_multisig-True] PASSED
test_session_execution_revoke[False-True-True-no_second_signer_no_multisig-False] PASSED
test_session_execution_revoke[False-True-True-no_second_signer_no_multisig-True] PASSED
test_session_execution_revoke[False-True-True-with_secp256r1_no_multisig-False] PASSED
test_session_execution_revoke[False-True-True-with_secp256r1_no_multisig-True] PASSED
test_session_execution_revoke[False-True-True-with_secp256r1_multisig-False] PASSED
test_session_execution_revoke[False-True-True-with_secp256r1_multisig-True] PASSED
test_session_execution_revoke[False-True-True-with_webauthn_no_multisig-False] PASSED
test_session_execution_revoke[False-True-True-with_webauthn_no_multisig-True] PASSED
test_session_execution_revoke[False-True-True-with_webauthn_multisig-False] PASSED
test_session_execution_revoke[False-True-True-with_webauthn_multisig-True] PASSED
```

```
test_session_execution_revoke[True-False-True-no_second_signer_no_multisig-False] PASSED
test_session_execution_revoke[True-False-True-no_second_signer_no_multisig-True] PASSED
test_session_execution_revoke[True-False-True-with_secp256r1_no_multisig-False] PASSED
test_session_execution_revoke[True-False-True-with_secp256r1_no_multisig-True] PASSED
test_session_execution_revoke[True-False-True-with_secp256r1_multisig-False] PASSED
test_session_execution_revoke[True-False-True-with_secp256r1_multisig-True] PASSED
test_session_execution_revoke[True-False-True-with_webauthn_no_multisig-False] PASSED
test_session_execution_revoke[True-False-True-with_webauthn_no_multisig-True] PASSED
test_session_execution_revoke[True-False-True-with_webauthn_multisig-False] PASSED
test_session_execution_revoke[True-False-True-with_webauthn_multisig-True] PASSED
test_session_execution_revoke[True-True-False-no_second_signer_no_multisig-False] PASSED
test_session_execution_revoke[True-True-False-no_second_signer_no_multisig-True] PASSED
test_session_execution_revoke[True-True-False-with_secp256r1_no_multisig-False] PASSED
test_session_execution_revoke[True-True-False-with_secp256r1_no_multisig-True] PASSED
test_session_execution_revoke[True-True-False-with_secp256r1_multisig-False] PASSED
test_session_execution_revoke[True-True-False-with_secp256r1_multisig-True] PASSED
test_session_execution_revoke[True-True-False-with_webauthn_no_multisig-False] PASSED
test_session_execution_revoke[True-True-False-with_webauthn_no_multisig-True] PASSED
test_session_execution_revoke[True-True-False-with_webauthn_multisig-False] PASSED
test_session_execution_revoke[True-True-False-with_webauthn_multisig-True] PASSED
test_session_execution_revoke[True-True-True-no_second_signer_no_multisig-False] PASSED
test_session_execution_revoke[True-True-True-no_second_signer_no_multisig-True] PASSED
test_session_execution_revoke[True-True-True-with_secp256r1_no_multisig-False] PASSED
test_session_execution_revoke[True-True-True-with_secp256r1_no_multisig-True] PASSED
test_session_execution_revoke[True-True-True-with_secp256r1_multisig-False] PASSED
test_session_execution_revoke[True-True-True-with_secp256r1_multisig-True] PASSED
test_session_execution_revoke[True-True-True-with_webauthn_no_multisig-False] PASSED
test_session_execution_revoke[True-True-True-with_webauthn_no_multisig-True] PASSED
test_session_execution_revoke[True-True-True-with_webauthn_multisig-False] PASSED
test_session_execution_revoke[True-True-True-with_webauthn_multisig-True] PASSED
test_session_multiple_concurrent[False-True-False-no_second_signer_no_multisig] PASSED
test_session_multiple_concurrent[False-True-False-with_secp256r1_no_multisig] PASSED
test_session_multiple_concurrent[False-True-False-with_secp256r1_multisig] PASSED
test_session_multiple_concurrent[False-True-False-with_webauthn_no_multisig] PASSED
test_session_multiple_concurrent[False-True-False-with_webauthn_multisig] PASSED
test_session_multiple_concurrent[False-True-True-no_second_signer_no_multisig] PASSED
test_session_multiple_concurrent[False-True-True-with_secp256r1_no_multisig] PASSED
test_session_multiple_concurrent[False-True-True-with_secp256r1_multisig] PASSED
test_session_multiple_concurrent[False-True-True-with_webauthn_no_multisig] PASSED
test_session_multiple_concurrent[False-True-True-with_webauthn_multisig] PASSED
test_session_multiple_concurrent[False-False-False-no_second_signer_no_multisig] PASSED
test_session_multiple_concurrent[False-False-False-with_secp256r1_no_multisig] PASSED
test_session_multiple_concurrent[False-False-False-with_secp256r1_multisig] PASSED
test_session_multiple_concurrent[False-False-False-with_webauthn_no_multisig] PASSED
test_session_multiple_concurrent[False-False-False-with_webauthn_multisig] PASSED
test_session_multiple_concurrent[False-False-True-no_second_signer_no_multisig] PASSED
test_session_multiple_concurrent[False-False-True-with_secp256r1_no_multisig] PASSED
test_session_multiple_concurrent[False-False-True-with_secp256r1_multisig] PASSED
test_session_multiple_concurrent[False-False-True-with_webauthn_no_multisig] PASSED
test_session_multiple_concurrent[False-False-True-with_webauthn_multisig] PASSED
test_session_multiple_concurrent[True-True-False-no_second_signer_no_multisig] PASSED
test_session_multiple_concurrent[True-True-False-with_secp256r1_no_multisig] PASSED
test_session_multiple_concurrent[True-True-False-with_secp256r1_multisig] PASSED
test_session_multiple_concurrent[True-True-False-with_webauthn_no_multisig] PASSED
test_session_multiple_concurrent[True-True-False-with_webauthn_multisig] PASSED
test_session_multiple_concurrent[True-True-True-no_second_signer_no_multisig] PASSED
test_session_multiple_concurrent[True-True-True-with_secp256r1_no_multisig] PASSED
test_session_multiple_concurrent[True-True-True-with_secp256r1_multisig] PASSED
test_session_multiple_concurrent[True-True-True-with_webauthn_no_multisig] PASSED
test_session_multiple_concurrent[True-True-True-with_webauthn_multisig] PASSED
test_session_multiple_concurrent[True-False-False-no_second_signer_no_multisig] PASSED
test_session_multiple_concurrent[True-False-False-with_secp256r1_no_multisig] PASSED
test_session_multiple_concurrent[True-False-False-with_secp256r1_multisig] PASSED
test_session_multiple_concurrent[True-False-False-with_webauthn_no_multisig] PASSED
test_session_multiple_concurrent[True-False-False-with_webauthn_multisig] PASSED
test_session_multiple_concurrent[True-False-True-no_second_signer_no_multisig] PASSED
test_session_multiple_concurrent[True-False-True-with_secp256r1_no_multisig] PASSED
test_session_multiple_concurrent[True-False-True-with_secp256r1_multisig] PASSED
test_session_multiple_concurrent[True-False-True-with_webauthn_no_multisig] PASSED
test_session_multiple_concurrent[True-False-True-with_webauthn_multisig] PASSED
test_session_execution_expiry[False-False-True-no_second_signer_no_multisig] PASSED
test_session_execution_expiry[False-False-True-with_secp256r1_no_multisig] PASSED
test_session_execution_expiry[False-False-True-with_secp256r1_multisig] PASSED
test_session_execution_expiry[False-False-True-with_webauthn_no_multisig] PASSED
test_session_execution_expiry[False-False-True-with_webauthn_multisig] PASSED
test_session_execution_expiry[False-False-False-no_second_signer_no_multisig] PASSED
test_session_execution_expiry[False-False-False-with_secp256r1_no_multisig] PASSED
test_session_execution_expiry[False-False-False-with_secp256r1_multisig] PASSED
test_session_execution_expiry[False-False-False-with_webauthn_no_multisig] PASSED
test_session_execution_expiry[False-False-False-with_webauthn_multisig] PASSED
test_session_execution_expiry[False-True-True-no_second_signer_no_multisig] PASSED
test_session_execution_expiry[False-True-True-with_secp256r1_no_multisig] PASSED
test_session_execution_expiry[False-True-True-with_secp256r1_multisig] PASSED
test_session_execution_expiry[False-True-True-with_webauthn_no_multisig] PASSED
test_session_execution_expiry[False-True-True-with_webauthn_multisig] PASSED
test_session_execution_expiry[False-True-False-no_second_signer_no_multisig] PASSED
test_session_execution_expiry[False-True-False-with_secp256r1_no_multisig] PASSED
test_session_execution_expiry[False-True-False-with_secp256r1_multisig] PASSED
test_session_execution_expiry[False-True-False-with_webauthn_no_multisig] PASSED
test_session_execution_expiry[False-True-False-with_webauthn_multisig] PASSED
test_session_execution_expiry[True-False-True-no_second_signer_no_multisig] PASSED
test_session_execution_expiry[True-False-True-with_secp256r1_no_multisig] PASSED
test_session_execution_expiry[True-False-True-with_secp256r1_multisig] PASSED
test_session_execution_expiry[True-False-True-with_webauthn_no_multisig] PASSED
test_session_execution_expiry[True-False-True-with_webauthn_multisig] PASSED
test_session_execution_expiry[True-False-False-no_second_signer_no_multisig] PASSED
test_session_execution_expiry[True-False-False-with_secp256r1_no_multisig] PASSED
test_session_execution_expiry[True-False-False-with_secp256r1_multisig] PASSED
test_session_execution_expiry[True-False-False-with_webauthn_no_multisig] PASSED
test_session_execution_expiry[True-False-False-with_webauthn_multisig] PASSED
test_session_execution_expiry[True-True-True-no_second_signer_no_multisig] PASSED
test_session_execution_expiry[True-True-True-with_secp256r1_no_multisig] PASSED
test_session_execution_expiry[True-True-True-with_secp256r1_multisig] PASSED
test_session_execution_expiry[True-True-True-with_webauthn_no_multisig] PASSED
test_session_execution_expiry[True-True-True-with_webauthn_multisig] PASSED
test_session_execution_expiry[True-True-False-no_second_signer_no_multisig] PASSED
test_session_execution_expiry[True-True-False-with_secp256r1_no_multisig] PASSED
test_session_execution_expiry[True-True-False-with_secp256r1_multisig] PASSED
test_session_execution_expiry[True-True-False-with_webauthn_no_multisig] PASSED
test_session_execution_expiry[True-True-False-with_webauthn_multisig] PASSED
test_session_execution_with_invalid_call[False-True-False-no_second_signer_no_multisig] PASSED
test_session_execution_with_invalid_call[False-True-False-with_secp256r1_no_multisig] PASSED
test_session_execution_with_invalid_call[False-True-False-with_secp256r1_multisig] PASSED
test_session_execution_with_invalid_call[False-True-False-with_webauthn_no_multisig] PASSED
test_session_execution_with_invalid_call[False-True-False-with_webauthn_multisig] PASSED
test_session_execution_with_invalid_call[False-True-True-no_second_signer_no_multisig] PASSED
```

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test_session_execution_invalid_sig[False-False-with_secp256r1_multisig] PASSED PASSED
test_session_execution_with_invalid_call[False-True-True-with_secp256r1_multisig] PASSED
test_session_execution_with_invalid_call[False-True-True-with_webauthn_no_multisig] PASSED
test_session_execution_with_invalid_call[False-True-True-with_webauthn_multisig] PASSED
test_session_execution_with_invalid_call[False-False-False-no_second_signer_no_multisig] PASSED
test_session_execution_with_invalid_call[False-False-False-with_secp256r1_no_multisig] PASSED
test_session_execution_with_invalid_call[False-False-False-with_secp256r1_multisig] PASSED
test_session_execution_with_invalid_call[False-False-False-with_webauthn_no_multisig] PASSED
test_session_execution_with_invalid_call[False-False-False-with_webauthn_multisig] PASSED
test_session_execution_with_invalid_call[False-False-True-no_second_signer_no_multisig] PASSED
test_session_execution_with_invalid_call[False-False-True-with_secp256r1_no_multisig] PASSED
test_session_execution_with_invalid_call[False-False-True-with_secp256r1_multisig] PASSED
test_session_execution_with_invalid_call[False-False-True-with_webauthn_no_multisig] PASSED
test_session_execution_with_invalid_call[False-False-True-with_webauthn_multisig] PASSED
test_session_execution_with_invalid_call[True-True-False-no_second_signer_no_multisig] PASSED
test_session_execution_with_invalid_call[True-True-False-with_secp256r1_no_multisig] PASSED
test_session_execution_with_invalid_call[True-True-False-with_secp256r1_multisig] PASSED
test_session_execution_with_invalid_call[True-True-False-with_webauthn_no_multisig] PASSED
test_session_execution_with_invalid_call[True-True-False-with_webauthn_multisig] PASSED
test_session_execution_with_invalid_call[True-True-True-no_second_signer_no_multisig] PASSED
test_session_execution_with_invalid_call[True-True-True-with_secp256r1_no_multisig] PASSED
test_session_execution_with_invalid_call[True-True-True-with_secp256r1_multisig] PASSED
test_session_execution_with_invalid_call[True-True-True-with_webauthn_no_multisig] PASSED
test_session_execution_with_invalid_call[True-True-True-with_webauthn_multisig] PASSED
test_session_execution_with_invalid_call[True-False-False-no_second_signer_no_multisig] PASSED
test_session_execution_with_invalid_call[True-False-False-with_secp256r1_no_multisig] PASSED
test_session_execution_with_invalid_call[True-False-False-with_secp256r1_multisig] PASSED
test_session_execution_with_invalid_call[True-False-False-with_webauthn_no_multisig] PASSED
test_session_execution_with_invalid_call[True-False-False-with_webauthn_multisig] PASSED
test_session_execution_with_invalid_call[True-False-True-no_second_signer_no_multisig] PASSED
test_session_execution_with_invalid_call[True-False-True-with_secp256r1_no_multisig] PASSED
test_session_execution_with_invalid_call[True-False-True-with_secp256r1_multisig] PASSED
test_session_execution_with_invalid_call[True-False-True-with_webauthn_no_multisig] PASSED
test_session_execution_with_invalid_call[True-False-True-with_webauthn_multisig] PASSED
test_session_execution_invalid_sig[False-False-no_second_signer_no_multisig] PASSED
test_session_execution_invalid_sig[False-False-with_secp256r1_no_multisig] PASSED
test_session_execution_invalid_sig[False-False-with_secp256r1_multisig] PASSED
test_session_execution_invalid_sig[False-False-with_webauthn_no_multisig] PASSED
test_session_execution_invalid_sig[False-False-with_webauthn_multisig] PASSED
test_session_execution_invalid_sig[False-True-no_second_signer_no_multisig] PASSED
test_session_execution_invalid_sig[False-True-with_secp256r1_no_multisig] PASSED
test_session_execution_invalid_sig[False-True-with_secp256r1_multisig] PASSED
test_session_execution_invalid_sig[False-True-with_webauthn_no_multisig] PASSED
test_session_execution_invalid_sig[False-True-with_webauthn_multisig] PASSED
test_session_execution_invalid_sig[True-False-no_second_signer_no_multisig] PASSED
test_session_execution_invalid_sig[True-False-with_secp256r1_no_multisig] PASSED
test_session_execution_invalid_sig[True-False-with_secp256r1_multisig] PASSED
test_session_execution_invalid_sig[True-False-with_webauthn_no_multisig] PASSED
test_session_execution_invalid_sig[True-False-with_webauthn_multisig] PASSED
test_session_execution_invalid_sig[True-True-no_second_signer_no_multisig] PASSED
test_session_execution_invalid_sig[True-True-with_secp256r1_no_multisig] PASSED
test_session_execution_invalid_sig[True-True-with_secp256r1_multisig] PASSED
test_session_execution_invalid_sig[True-True-with_webauthn_no_multisig] PASSED
test_session_execution_invalid_sig[True-True-with_webauthn_multisig] PASSED
test_session_execution_invalid_caller[False-False-no_second_signer_no_multisig] PASSED
test_session_execution_invalid_caller[False-False-with_secp256r1_no_multisig] PASSED
test_session_execution_invalid_caller[False-False-with_secp256r1_multisig] PASSED
test_session_execution_invalid_caller[False-False-with_webauthn_no_multisig] PASSED
test_session_execution_invalid_caller[False-False-with_webauthn_multisig] PASSED
test_session_execution_invalid_caller[False-True-no_second_signer_no_multisig] PASSED
test_session_execution_invalid_caller[False-True-with_secp256r1_no_multisig] PASSED
test_session_execution_invalid_caller[False-True-with_secp256r1_multisig] PASSED
test_session_execution_invalid_caller[False-True-with_webauthn_no_multisig] PASSED
test_session_execution_invalid_caller[False-True-with_webauthn_multisig] PASSED
test_session_execution_invalid_caller[True-False-no_second_signer_no_multisig] PASSED
test_session_execution_invalid_caller[True-False-with_secp256r1_no_multisig] PASSED
test_session_execution_invalid_caller[True-False-with_secp256r1_multisig] PASSED
test_session_execution_invalid_caller[True-False-with_webauthn_no_multisig] PASSED
test_session_execution_invalid_caller[True-False-with_webauthn_multisig] PASSED
test_session_execution_invalid_caller[True-True-no_second_signer_no_multisig] PASSED
test_session_execution_invalid_caller[True-True-with_secp256r1_no_multisig] PASSED
test_session_execution_invalid_caller[True-True-with_secp256r1_multisig] PASSED
test_session_execution_invalid_caller[True-True-with_webauthn_no_multisig] PASSED
test_session_execution_invalid_caller[True-True-with_webauthn_multisig] PASSED
test_session_gas_limit_overload[False-no_second_signer_no_multisig] PASSED
test_session_gas_limit_overload[False-with_secp256r1_no_multisig] PASSED
test_session_gas_limit_overload[False-with_secp256r1_multisig] PASSED
test_session_gas_limit_overload[False-with_webauthn_no_multisig] PASSED
test_session_gas_limit_overload[False-with_webauthn_multisig] PASSED
test_session_gas_limit_overload[True-no_second_signer_no_multisig] PASSED
test_session_gas_limit_overload[True-with_secp256r1_no_multisig] PASSED
test_session_gas_limit_overload[True-with_secp256r1_multisig] PASSED
test_session_gas_limit_overload[True-with_webauthn_no_multisig] PASSED
test_session_gas_limit_overload[True-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-False-False-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-False-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-False-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-False-False-with_webauthn_no_multisig] PASSED
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test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-False-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-False-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-False-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-False-True-with_webauthn_no_multisig] PASSED
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test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-True-False-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-True-False-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-True-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-True-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-True-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-True-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-False-True-True-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-False-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-False-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-False-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-False-True-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from- 3852917727250903181577009370450861452735632474024575187481970668081553363 71-True-True-False-no_second_signer_no_multisig] PASSED
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test_session_spending_limits[False-transfer_from-385291772725090318157700937045086145273563247402457518748197066808155336371-True-True-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-385291772725090318157700937045086145273563247402457518748197066808155336371-True-True-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from-385291772725090318157700937045086145273563247402457518748197066808155336371-True-True-False-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-385291772725090318157700937045086145273563247402457518748197066808155336371-True-True-False-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from-385291772725090318157700937045086145273563247402457518748197066808155336371-True-True-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-385291772725090318157700937045086145273563247402457518748197066808155336371-True-True-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-385291772725090318157700937045086145273563247402457518748197066808155336371-True-True-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from-385291772725090318157700937045086145273563247402457518748197066808155336371-True-True-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-385291772725090318157700937045086145273563247402457518748197066808155336371-True-True-True-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-False-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-False-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-False-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-False-True-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-False-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-False-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-False-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-False-True-True-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-False-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-False-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-False-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-True-with_webauthn_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-True-False-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-True-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-True-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-True-False-with_webauthn_no_multisig] PASSED
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test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-True-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-True-True-with_secp256r1_no_multisig] PASSED
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test_session_spending_limits[False-transfer_from-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-True-True-with_webauthn_no_multisig] PASSED
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test_session_spending_limits[False-transferFrom-385291772725090318157700937045086145273563247402457518748197066808155336371-False-False-False-no_second_signer_no_multisig] PASSED
test_session_spending_limits[False-transferFrom-385291772725090318157700937045086145273563247402457518748197066808155336371-False-False-False-with_secp256r1_no_multisig] PASSED
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test_session_spending_limits[False-transferFrom-241582319990446964803203690812927327382272625871840775106269454549034349073 3-True-False-True-with_secp256r1_no_multisig] PASSED
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test_session_spending_limits[False-transferFrom- 2415823199904469648032036908129273273822726258718407751062694545490343490733 -True-False-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[False-transferFrom- 2415823199904469648032036908129273273822726258718407751062694545490343490733 -True-False-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[False-transferFrom- 2415823199904469648032036908129273273822726258718407751062694545490343490733 -True-False-True-with_webauthn_multisig] PASSED
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test_session_spending_limits[False-transferFrom- 2415823199904469648032036908129273273822726258718407751062694545490343490733 -True-True-False-with_secp256r1_multisig] PASSED
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test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -False-True-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -False-True-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -False-True-False-with_webauthn_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -False-True-False-with_webauthn_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -False-True-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -False-True-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -False-True-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -False-True-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -False-True-True-with_webauthn_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-False-no_second_signer_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-False-with_webauthn_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-False-with_webauthn_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-False-True-with_webauthn_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-False-no_second_signer_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-False-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-False-with_secp256r1_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-False-with_webauthn_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-False-with_webauthn_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-True-no_second_signer_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-True-with_secp256r1_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-True-with_secp256r1_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-True-with_webauthn_no_multisig] PASSED
test_session_spending_limits[True-transferFrom- 2415823199044696480320369081292732738227626587184077510626945454903434907 33 -True-True-True-with_webauthn_multisig] PASSED
test_session_revoke_via_outside_execution[False-False] PASSED
test_session_revoke_via_outside_execution[False-True] PASSED
test_session_revoke_via_outside_execution[True-False] PASSED
test_session_revoke_via_outside_execution[True-True] PASSED
test_session_self_calls_are_blocked[False-False] PASSED
test_session_self_calls_are_blocked[False-True] PASSED
test_session_self_calls_are_blocked[True-False] PASSED
test_session_self_calls_are_blocked[True-True] PASSED
test_session_bad_call_hints[False-False] PASSED
test_session_bad_call_hints[False-True] PASSED
test_session_bad_call_hints[True-False] PASSED
test_session_bad_call_hints[True-True] PASSED
test_session_owner_signature_length[True] PASSED
test_setting_low_withdrawal_threshold_success[with_secp256r1_no_multisig] PASSED
test_setting_low_withdrawal_threshold_success[with_secp256r1_multisig] PASSED
test_setting_low_withdrawal_threshold_success[with_webauthn_secp256r1_no_multisig] PASSED
test_setting_low_withdrawal_threshold_success[with_webauthn_secp256r1_multisig] PASSED
test_est_fee_sig_bypass[stark_signer] PASSED
test_est_fee_sig_bypass[secp256r1_no_multisig] PASSED
test_est_fee_sig_bypass[webauthn_no_multisig] PASSED
test_est_fee_sig_bypass[stark_secp256r1_multisig] PASSED
test_est_fee_sig_bypass[stark_webauthn_multisig] PASSED
test_est_fee_sig_bypass[secp256r1_webauthn_multisig] PASSED
test_setting_low_withdrawal_threshold_failure[basic_stark_should_fail] PASSED
test_setting_high_withdrawal_threshold_success[with_secp256r1_multisig] PASSED
test_setting_high_withdrawal_threshold_failure[basic_stark_should_fail] PASSED
test_setting_high_withdrawal_threshold_failure[with_secp256r1_no_multisig_should_fail] PASSED
test_removing_low_threshold[with_secp256r1_no_multisig_no_high] PASSED
test_removing_low_threshold[with_secp256r1_multisig_no_high] PASSED
test_removing_low_threshold[with_secp256r1_multisig_with_high] PASSED
test_removing_low_threshold[with_secp256r1_multisig_no_high_2_of_3] PASSED
test_removing_low_threshold[with_secp256r1_multisig_with_high_2_of_3] PASSED
test_removing_low_threshold[with_secp256r1_multisig_no_high_3_of_3] PASSED
test_removing_low_threshold[with_secp256r1_multisig_with_high_3_of_3] PASSED
test_removing_low_threshold[with_secp256r1_and_webauthn_multisig_no_high_2_of_3] PASSED
test_removing_low_threshold[with_secp256r1_and_webauthn_multisig_with_high_2_of_3] PASSED
test_removing_high_threshold[without_existing_lower_threshold] PASSED
test_removing_high_threshold[with_existing_lower_threshold] PASSED
test_pricing_contract PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_eth_with_hws_webauthn] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_eth_with_stark_webauthn] PASSED
test_successful_single_range_transfer[transfer_low_thresh_usdc_with_stark_webauthn] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_usdc_with_stark_webauthn] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_usdc_with_hws_webauthn] PASSED
test_successful_single_range_transfer[transfer_high_thresh_multisig_usdc_with_hws_webauthn] PASSED
test_successful_single_range_transfer[transfer_high_thresh_multisig_eth_with_hws_webauthn] PASSED
test_successful_single_range_transfer[transfer_low_thresh_eth_with_hws_webauthn] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_usdc_with_stark] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_usdc_with_hws] PASSED
test_successful_single_range_transfer[transfer_low_thresh_usdc_with_stark] PASSED
test_successful_single_range_transfer[transfer_high_thresh_multisig_usdc_with_hws] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_eth_with_stark] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_eth_with_hws] PASSED
test_successful_single_range_transfer[transfer_high_thresh_multisig_eth_with_hws] PASSED
test_successful_single_range_transfer[transfer_low_thresh_eth_with_hws] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_eth_with_hws_webauthn_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_eth_with_stark_webauthn_v3] PASSED
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test_successful_single_range_transfer[transfer_low_thresh_usdc_with_stark_webauthn_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_usdc_with_stark_webauthn_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_usdc_with_hws_webauthn_v3] PASSED
test_successful_single_range_transfer[transfer_high_thresh_multisig_usdc_with_hws_webauthn_v3] PASSED
test_successful_single_range_transfer[transfer_high_thresh_multisig_eth_with_hws_webauthn_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_eth_with_hws_webauthn_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_usdc_with_stark_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_usdc_with_hws_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_usdc_with_stark_v3] PASSED
test_successful_single_range_transfer[transfer_high_thresh_multisig_usdc_with_hws_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_eth_with_stark_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_multisig_eth_with_hws_v3] PASSED
test_successful_single_range_transfer[transfer_high_thresh_multisig_eth_with_hws_v3] PASSED
test_successful_single_range_transfer[transfer_low_thresh_eth_with_hws_v3] PASSED
test_successful_dual_threshold_transfer[transfer_usdc] PASSED
test_successful_dual_threshold_transfer[transfer_eth] PASSED
test_successful_dual_threshold_transfer[transfer_usdc_v3] PASSED
test_successful_dual_threshold_transfer[transfer_eth_v3] PASSED
test_non_whitelisted_token_cannot_bypass[transfer] PASSED
test_bad_calls_structure_cant_bypass PASSED
test_bad_transfer_call PASSED
test_changing_rate_works[transfer_lower_rate] PASSED
test_changing_rate_works[transfer_higher_rate] PASSED
test_changing_rate_works[transfer_lower_close_rate] PASSED
test_changing_rate_works[transfer_higher_close_rate] PASSED
test_transfer_amount_too_large_for_u128 PASSED
test_successful_multicall[low_thresh_multisig_with_stark] PASSED
test_successful_multicall[low_thresh_multisig_with_hws] PASSED
test_successful_multicall[low_thresh_no_multsig_with_stark] PASSED
test_successful_multicall[high_thresh_multisig_with_hws] PASSED
test_successful_multicall[low_high_thresh_multisig_with_hws] PASSED
test_successful_multicall[low_thresh_multisig_with_stark_v3] PASSED
test_successful_multicall[low_thresh_multisig_with_hws_v3] PASSED
test_successful_multicall[low_thresh_no_multsig_with_stark_v3] PASSED
test_successful_multicall[high_thresh_multisig_with_hws_v3] PASSED
test_successful_multicall[low_high_thresh_multisig_with_hws_v3] PASSED
test_multicall_bypass_failures PASSED
test_deployment[signers_0_threshold_0] PASSED
test_deployment[signers_0_threshold_1] PASSED
test_deployment[signers_0_threshold_2] PASSED
test_deployment[signers_1_threshold_0] PASSED
test_deployment[signers_1_threshold_1] PASSED
test_deployment[signers_1_threshold_2] PASSED
test_deployment[signers_2_same_pubkey_threshold_0] PASSED
test_deployment[signers_2_same_pubkey_threshold_1] PASSED
test_deployment[signers_2_same_pubkey_threshold_2] PASSED
test_deployment[signers_2_threshold_0] PASSED
test_deployment[signers_2_threshold_1] PASSED
test_deployment[signers_2_threshold_2] PASSED
test_deployment[signers_3_threshold_2] PASSED
test_deployment_with_duplicate_accounts PASSED
test_invoke_without_balance[v1] PASSED
test_invoke_without_balance[v3] PASSED
test_invoke[signers_1_threshold_0_sign_0] PASSED
test_invoke[signers_2_threshold_0_sign_0] PASSED
test_invoke[signers_2_threshold_0_sign_1] PASSED
test_invoke[signers_2_threshold_2_sign_0] PASSED
test_invoke[signers_2_threshold_2_sign_1] PASSED
test_invoke[signers_2_threshold_2_sign_1_0] PASSED
test_invoke[signers_2_threshold_2_sign_0_1] PASSED
test_invoke[signers_3_threshold_2_sign_0] PASSED
test_invoke[signers_3_threshold_2_sign_0_1] PASSED
test_invoke[signers_3_threshold_2_sign_0_1_2] PASSED
test_invoke[signers_3_threshold_3_sign_0] PASSED
test_invoke[signers_3_threshold_3_sign_0_1_2] PASSED
test_invoke[signers_1_threshold_0_sign_0_v3] PASSED
test_invoke[signers_2_threshold_0_sign_0_v3] PASSED
test_invoke[signers_2_threshold_0_sign_1_v3] PASSED
test_invoke[signers_2_threshold_2_sign_0_v3] PASSED
test_invoke[signers_2_threshold_2_sign_1_v3] PASSED
test_invoke[signers_2_threshold_2_sign_1_0_v3] PASSED
test_invoke[signers_2_threshold_2_sign_0_1_v3] PASSED
test_invoke[signers_3_threshold_2_sign_0_v3] PASSED
test_invoke[signers_3_threshold_2_sign_0_1_v3] PASSED
test_invoke[signers_3_threshold_2_sign_0_1_2_v3] PASSED
test_invoke[signers_3_threshold_3_sign_0_v3] PASSED
test_invoke[signers_3_threshold_3_sign_0_1_2_v3] PASSED
test_invoke_with_invalid_params[signers_2_threshold_2_sign_0_0] PASSED
test_invoke_with_invalid_params[signers_3_threshold_3_sign_0_1] PASSED
test_invoke_with_invalid_params[signers_3_threshold_3_sign_0_1_1] PASSED
test_invoke_with_invalid_params[signers_2_threshold_2_sign_0_0_v3] PASSED
test_invoke_with_invalid_params[signers_3_threshold_3_sign_0_1_v3] PASSED
test_invoke_with_invalid_params[signers_3_threshold_3_sign_0_1_1_v3] PASSED
test_try_invoke_with_missing_max_fee[v1] PASSED
test_try_invoke_with_missing_max_fee[v3] PASSED
test_try_invoke_with_signing_max_fee_too_high[v1] PASSED
test_try_invoke_with_signing_max_fee_too_high[v3] PASSED
test_try_replace_max_fee[v1] PASSED
test_try_replace_max_fee[v3] PASSED
test_try_exceed_executing_max_fee[v1] PASSED
test_try_exceed_executing_max_fee[v3] PASSED
test_try_exceed_executing_max_fee_on_first_call[v1] PASSED
test_try_exceed_executing_max_fee_on_first_call[v3] PASSED
test_try_exceed_signing_max_fee_on_first_tx[v1] PASSED
test_try_exceed_signing_max_fee_on_first_tx[v3] PASSED
test_try_exceed_signing_max_fee[v1] PASSED
test_try_exceed_signing_max_fee[v3] PASSED
test_try_invoke_with_invalid_signer[signers_1_threshold_0_sign_0] PASSED
test_try_invoke_with_invalid_signer[signers_2_threshold_0_sign_0] PASSED
test_try_invoke_with_invalid_signer[signers_2_threshold_0_sign_0_1] PASSED
test_try_invoke_with_invalid_signer[signers_2_threshold_0_sign_1_0] PASSED
test_try_invoke_with_invalid_signer[signers_2_threshold_2_sign_1_0] PASSED
test_try_invoke_with_invalid_signer[signers_3_threshold_0_sign_1_2_0] PASSED
test_sign_pending_multisig_transaction[signers_2_threshold_2_sign_0_sign_1] PASSED
test_sign_pending_multisig_transaction[signers_3_threshold_3_sign_0_sign_1] PASSED
test_sign_pending_multisig_transaction[signers_3_threshold_2_sign_0_sign_1] PASSED
test_sign_pending_multisig_transaction_with_invalid_params[signers_2_threshold_2_sign_0_sign_0] PASSED
test_sign_pending_multisig_transaction_with_invalid_params[signers_3_threshold_3_sign_0_1_sign_1] PASSED
test_sign_pending_multisig_transaction_with_invalid_params[signers_3_threshold_3_sign_0_sign_0_1] PASSED
test_sign_pending_multisig_transaction_with_invalid_params[signers_3_threshold_3_sign_0_sign_0_1_2] PASSED
test_sign_pending_multisig_transaction_with_invalid_params[signers_3_threshold_3_sign_0_1_sign_2] PASSED
test_sign_pending_multisig_transaction_with_invalid_params[signers_3_threshold_3_sign_0_sign_1_2] PASSED
test_execute_pending_in_third_tx PASSED
test_try_sign_pending_with_same_signer_twice PASSED
test_sign_executed_tx PASSED
test_sign_invalid_tx[invalid_fee_in_calls] PASSED
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test_sign_invalid_tx[invalid_nonce] PASSED
test_sign_invalid_tx[invalid_all] PASSED
test_sign_without_pending PASSED
test_sign_pending_with_invalid_signer[signers_2_threshold_2_sign_1] PASSED
test_sign_pending_with_invalid_signer[signers_2_threshold_2_sign_0_1] PASSED
test_sign_pending_with_invalid_signer[signers_2_threshold_2_sign_2] PASSED
test_sign_pending_with_invalid_signer[signers_3_threshold_3_sign_2] PASSED
test_sign_pending_with_invalid_signer[signers_3_threshold_3_sign_1] PASSED
test_sign_pending_with_invalid_signer[signers_3_threshold_3_sign_1_2] PASSED
test_sign_pending_with_invalid_signer[signers_3_threshold_3_sign_1_2_reverse] PASSED
test_sign_pending_with_invalid_signer[signers_3_threshold_2_sign_1_2] PASSED
test_sign_with_duplicate_signers_in_one_tx PASSED
test_sign_with_duplicate_signers_in_two_tx PASSED
test_estimate_fee_allow_different_pending_hash PASSED
test_estimate_fee_allow_invalid_sig PASSED
test_daily_transaction_limit PASSED
test_dtl_with_execute_txn[signers_3_threshold_2_sign_0_sign_2] PASSED
test_dtl_with_execute_txn[signers_3_threshold_2_sign_1_sign_2] PASSED
test_dtl_with_validate_txn PASSED
test_dtl_reset_on_next_day PASSED
test_dtl_with_reverted_tx PASSED
test_dtl_with_not_validated_tx PASSED
test_get_tx_count PASSED
test_multicall_dapp_sanity PASSED
test_external_entrypoint_guards PASSED
test_is_valid_sig_sanity_stark_indexed PASSED
test_is_valid_sig_wrong_inner_sig PASSED
test_is_valid_sig_wrong_external_sig PASSED
test_is_valid_sig_wrong_hash_stark_indexed PASSED
test_is_valid_sig_2_sig_correct PASSED
test_is_valid_sig_2_sig_not_enough PASSED
test_multisig_override_pending_txn PASSED
test_get_signers[signers_1_threshold_0] PASSED
test_get_signers[signers_2_threshold_0] PASSED
test_get_signers[signers_2_threshold_2] PASSED
test_get_signers[signers_2_threshold_2_reversed] PASSED
test_get_signers[signers_3_threshold_2] PASSED
test_get_signers[signers_3_threshold_3] PASSED
test_add_external_signers PASSED
test_declare_disabled PASSED
test_add_same_external_signers_in_one_tx PASSED
test_add_same_external_signer_address_in_one_tx PASSED
test_add_same_external_signers_in_diff_tx PASSED
test_try_add_empty_external_signers PASSED
test_empty_sig PASSED
test_try_remove_all_signers PASSED
test_remove_external_signers[signer_0_threshold_0] PASSED
test_remove_external_signers[signer_1_threshold_0] PASSED
test_invalid_threshold_after_remove_external_signers PASSED
test_removing_duplicate_signer_guids PASSED
test_removing_nonexistent_signer_guids PASSED
test_remove_and_add_external_signers PASSED
test_try_remove_deleted_signers PASSED
test_account_with_50_signers_sign_in_1_tx PASSED
test_account_with_50_signers_sign_in_2_tx_partial PASSED
test_upgrade[src6_supported] PASSED
test_upgrade[src6_not_supported] PASSED
test_regenesis_upgrade[4_of_2_non_deleted] PASSED
test_regenesis_upgrade[6_of_3_deleted_1_2_6] PASSED
test_moa_signer_valid[basic_stark_signer] PASSED
test_moa_signer_valid[with_secp256r1_no_multisig] PASSED
test_moa_signer_valid[with_secp256r1_multisig] PASSED
test_moa_signer_valid[with_webauthn_no_multisig] PASSED
test_moa_signer_valid[with_webauthn_multisig] PASSED
test_rpc0_8 PASSED
```

9 About Nethermind

Nethermind is a Blockchain Research and Software Engineering company. Our work touches every part of the web3 ecosystem - from layer 1 and layer 2 engineering, cryptography research, and security to application-layer protocol development. We offer strategic support to our institutional and enterprise partners across the blockchain, digital assets, and DeFi sectors, guiding them through all stages of the research and development process, from initial concepts to successful implementation.

We offer security audits of projects built on EVM-compatible chains and Starknet. We are active builders of the Starknet ecosystem, delivering a node implementation, a block explorer, a Solidity-to-Cairo transpiler, and formal verification tooling. Nethermind also provides strategic support to our institutional and enterprise partners in blockchain, digital assets, and decentralized finance (DeFi). In the next paragraphs, we introduce the company in more detail.

Blockchain Security: At Nethermind, we believe security is vital to the health and longevity of the entire Web3 ecosystem. We provide security services related to Smart Contract Audits, Formal Verification, and Real-Time Monitoring. Our Security Team comprises blockchain security experts in each field, often collaborating to produce comprehensive and robust security solutions. The team has a strong academic background, can apply state-of-the-art techniques, and is experienced in analyzing cutting-edge Solidity and Cairo smart contracts, such as ArgentX and StarkGate (the bridge connecting Ethereum and StarkNet). Most team members hold a Ph.D. degree and actively participate in the research community, accounting for 240+ articles published and 1,450+ citations in Google Scholar. The security team adopts customer-oriented and interactive processes where clients are involved in all stages of the work.

Blockchain Core Development: Our core engineering team, consisting of over 20 developers, maintains, improves, and upgrades our flagship product - the Nethermind Ethereum Execution Client. The client has been successfully operating for several years, supporting both the Ethereum Mainnet and its testnets, and now accounts for nearly a quarter of all synced Mainnet nodes. Our unwavering commitment to Ethereum's growth and stability extends to sidechains and layer 2 solutions. Notably, we were the sole execution layer client to facilitate Gnosis Chain's Merge, transitioning from Aura to Proof of Stake (PoS), and we are actively developing a full-node client to bolster Starknet's decentralization efforts. Our core team equips partners with tools for seamless node set-up, using generated docker-compose scripts tailored to their chosen execution client and preferred configurations for various network types.

DevOps and Infrastructure Management: Our infrastructure team ensures our partners' systems operate securely, reliably, and efficiently. We provide infrastructure design, deployment, monitoring, maintenance, and troubleshooting support, allowing you to focus on your core business operations. Boasting extensive expertise in Blockchain as a Service, private blockchain implementations, and node management, our infrastructure and DevOps engineers are proficient with major cloud solution providers and can host applications in-house or on clients' premises. Our global in-house SRE teams offer 24/7 monitoring and alerts for both infrastructure and application levels. We manage over 5,000 public and private validators and maintain nodes on major public blockchains such as Polygon, Gnosis, Solana, Cosmos, Near, Avalanche, Polkadot, Aptos, and StarkWare L2. Sedge is an open-source tool developed by our infrastructure experts, designed to simplify the complex process of setting up a proof-of-stake (PoS) network or chain validator. Sedge generates docker-compose scripts for the entire validator set-up based on the chosen client, making the process easier and quicker while following best practices to avoid downtime and being slashed.

Cryptography Research: At Nethermind, our Cryptography Research team is dedicated to continuous internal research while fostering close collaboration with external partners. The team has expertise across a wide range of domains, including cryptography protocols, consensus design, decentralized identity, verifiable credentials, Sybil resistance, oracles, and credentials, distributed validator technology (DVT), and Zero-knowledge proofs. This diverse skill set, combined with strong collaboration between our engineering teams, enables us to deliver cutting-edge solutions to our partners and clients.

Smart Contract Development & DeFi Research: Our smart contract development and DeFi research team comprises 40+ world-class engineers who collaborate closely with partners to identify needs and work on value-adding projects. The team specializes in Solidity and Cairo development, architecture design, and DeFi solutions, including DEXs, AMMs, structured products, derivatives, and money market protocols, as well as ERC20, 721, and 1155 token design. Our research and data analytics focuses on three key areas: technical due diligence, market research, and DeFi research. Utilizing a data-driven approach, we offer in-depth insights and outlooks on various industry themes.

Our suite of L2 tooling: Warp is Starknet's approach to EVM compatibility. It allows developers to take their Solidity smart contracts and transpile them to Cairo, Starknet's smart contract language. In the short time since its inception, the project has accomplished many achievements, including successfully transpiling Uniswap v3 onto Starknet using Warp.

- **Voyager** is a user-friendly Starknet block explorer that offers comprehensive insights into the Starknet network. With its intuitive interface and powerful features, Voyager allows users to easily search for and examine transactions, addresses, and contract details. As an essential tool for navigating the Starknet ecosystem, Voyager is the go-to solution for users seeking in-depth information and analysis;
- **Horus** is an open-source formal verification tool for StarkNet smart contracts. It simplifies the process of formally verifying Starknet smart contracts, allowing developers to express various assertions about the behavior of their code using a simple assertion language;
- **Juno** is a full-node client implementation for Starknet, drawing on the expertise gained from developing the Nethermind Client. Written in Golang and open-sourced from the outset, Juno verifies the validity of the data received from Starknet by comparing it to proofs retrieved from Ethereum, thus maintaining the integrity and security of the entire ecosystem.

Learn more about us at nethermind.io.

General Advisory to Clients

As auditors, we recommend that any changes or updates made to the audited codebase undergo a re-audit or security review to address potential vulnerabilities or risks introduced by the modifications. By conducting a re-audit or security review of the modified codebase, you can significantly enhance the overall security of your system and reduce the likelihood of exploitation. However, we do not possess the authority or right to impose obligations or restrictions on our clients regarding codebase updates, modifications, or subsequent audits. Accordingly, the decision to seek a re-audit or security review lies solely with you.

Disclaimer

This report is based on the scope of materials and documentation provided by you to Nethermind in order that Nethermind could conduct the security review outlined in **1. Executive Summary** and **2. Audited Files**. The results set out in this report may not be complete nor inclusive of all vulnerabilities. Nethermind has provided the review and this report on an as-is, where-is, and as-available basis. You agree that your access and/or use, including but not limited to any associated services, products, protocols, platforms, content, and materials, will be at your sole risk. Blockchain technology remains under development and is subject to unknown risks and flaws. The review does not extend to the compiler layer, or any other areas beyond the programming language, or other programming aspects that could present security risks. This report does not indicate the endorsement of any particular project or team, nor guarantee its security. No third party should rely on this report in any way, including for the purpose of making any decisions to buy or sell a product, service or any other asset. To the fullest extent permitted by law, Nethermind disclaims any liability in connection with this report, its content, and any related services and products and your use thereof, including, without limitation, the implied warranties of merchantability, fitness for a particular purpose, and non-infringement. Nethermind does not warrant, endorse, guarantee, or assume responsibility for any product or service advertised or offered by a third party through the product, any open source or third-party software, code, libraries, materials, or information linked to, called by, referenced by or accessible through the report, its content, and the related services and products, any hyperlinked websites, any websites or mobile applications appearing on any advertising, and Nethermind will not be a party to or in any way be responsible for monitoring any transaction between you and any third-party providers of products or services. As with the purchase or use of a product or service through any medium or in any environment, you should use your best judgment and exercise caution where appropriate. FOR AVOIDANCE OF DOUBT, THE REPORT, ITS CONTENT, ACCESS, AND/OR USAGE THEREOF, INCLUDING ANY ASSOCIATED SERVICES OR MATERIALS, SHALL NOT BE CONSIDERED OR RELIED UPON AS ANY FORM OF FINANCIAL, INVESTMENT, TAX, LEGAL, REGULATORY, OR OTHER ADVICE.