PlasmaPay

Security Assessment

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By :

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Overview

Project Summary

Project Name	PlasmaPay
Description	---
Platform	Ethereum; Solidity
Codebase	GitHub Repository
Commits	1. 5bb20de4e976aeaa7dcfcbb7a029cedd77f84ed4 2. 573d47cd11660940fe4cd3896ecd16b545f29df9 3. 539e8fe2cf6d2545a45b49402f26956706fb30ff

Audit Summary

Delivery Date	Oct. 28, 2020
Method of Audit	Static Analysis, Manual Review
Consultants Engaged	2
Timeline	Oct. 16, 2020 - Oct. 22 2020

Vulnerability Summary

Total Issues	0
Total Critical	0
Total Major	0
Total Minor	0
Total Informational	35

Findings

ID	Title	Type	Severity	Status
PPY-01	Outdated version of Solidity	Language Specific	Informational	Resolved
PPY-02	Usage of uint alias instead of uint256	Language Specific	Informational	Resolved
PPY-03	Use of pragma experimental ABIEncoderV2	Language Specific	Informational	Resolved
PPY-04	Function visibility can be external	Implementation	Informational	Resolved
PPY-05	Inefficient loop over storage array	Performance	Informational	Resolved
PPY-06	Ignoring return value of queued transaction hash	Implementation	Informational	Resolved
PPY-07	Inefficient loop over storage array	Performance	Informational	Resolved
PPY-08	Ignoring return data from executed transaction	Implementation	Informational	Resolved
PPY-09	Inefficient loop over storage array	Performance	Informational	Resolved
PPY-10	Unnecessary add256 function	Implementation	Informational	Resolved
PPY-11	Unnecessary sub256 function	Implementation	Informational	Resolved
PPY-12	Ignoring return value from IPpay.transfer	Implementation	Informational	Resolved
PPY-13	totalSupply can be declared constant	Implementation	Informational	Resolved
PPY-14	Minor re-entrancy issue in event emitting	Control Flow	Informational	Resolved
PPY-15	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-16	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-17	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-18	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-19	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-20	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-21	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-22	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-23	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-24	Usage of docstring on structure field	Language Specific	Informational	Resolved

PPY-25	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-26	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-27	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-28	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-29	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-30	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-31	Usage of docstring on structure field	Language Specific	Informational	Resolved
PPY-32	Usage of deprecated `.value(...)`	Language Specific	Informational	Resolved
PPY-33	Usage of docstring on internal state variable	Language Specific	Informational	Resolved
PPY-34	Usage of docstring on internal state variable	Language Specific	Informational	Resolved
PPY-35	Usage of deprecated `.value(...)`	Language Specific	Informational	Resolved

PPY-01: Outdated version of Solidity

Type	Severity	Location	Status
Language Specific	Informational	GovernerPlasma.sol, Ppay.sol, PlasmaVesting.sol, Timelock.sol	Resolved

Description:

The contracts are all compiled using Solidity version `pragma solidity ^0.5.16`, which is not the latest released version.

Recommendation:

Use the latest stable version of Solidity, `^0.6.12`.

Alleviation:

The recommendation was applied in commit 573d47cd11660940fe4cd3896ecd16b545f29df9.

PPY-02: Usage of uint alias instead of uint256

Type	Severity	Location	Status
Language Specific	Informational	GovernerPlasma.sol, Ppay.sol, PlasmaVesting.sol, Timelock.sol	Resolved

Description:

The aforementioned contracts are using `uint` to declare 256-bit unsigned integers. Although `uint` is an alias for `uint256` and both represent the same underlying integer allocation, it is advisable that for clean coding practices the complete form `uint256` should be used instead of the alias `uint`.

Recommendation:

We advise to use `uint256` instead of alias uint in all of the occurrences in the aforementioned contracts.

Alleviation:

The recommendation was applied in commit [573d47cd11660940fe4cd3896ecd16b545f29df9](573d47cd11660940fe4cd3896ecd16b545f29df9).

PPY-03: Use of pragma experimental ABIEncoderV2

Type	Severity	Location	Status
Language Specific	Informational	GovernerPlasma.sol, Ppay.sol	Resolved

Description:

`experimental ABIEncoderV2` is for experimental use and is not meant to be used in deployed code holding funds.

Recommendation:

Consider finding a stable way to implement any functionality in place of using the `experimental ABIEncoderV2` pragma.

Alleviation:

This type of action is only supported in the new experimental ABI encoder and was determined to be used correctly.

PPY-04: Function visibility can be external

Type	Severity	Location	Status
Implementation	Informational	GovernerPlasma L132 L172 L188 L198 L213 L218 L244 L248, PlasmaVesting L41 L46, Ppay L184 L197 L225, Timelock L36 L45 L53 L60 L71 L80	Resolved

Description:

The functions which are never called internally from within the contract should have `external` visibility. The functions on the aforementioned lines have `public` visibility which can be safely changed to `external` .

Recommendation:

We recommend to change the functions' visibilities from `public` to `external`.

Alleviation:

The recommendation was applied in commit 573d47cd11660940fe4cd3896ecd16b545f29df9.

PPY-05: Inefficient loop over storage array

Type	Severity	Location	Status
Performance	Informational	GovernerPlasma.sol L176	Resolved

Description:

The `queue` function in the `GovernerPlasma` contract performs a loop over an address array from a storage pointer while querying the loop over each iteration, which is inefficient:

```
for (uint i = 0; i < proposal.targets.length; i++) {
```

Recommendation:

Consider storing the length of the proposal targets array in a local variable in order to save on the overall cost of gas:

```
uint256 targetsLength = proposal.targets.length;
for (uint256 i = 0; i < targetsLength; i++) {
```

Alleviation:

The recommendation was applied in commit [573d47cd11660940fe4cd3896ecd16b545f29df9](573d47cd11660940fe4cd3896ecd16b545f29df9).

PPY-06: Ignoring return value of queued transaction hash

Type	Severity	Location	Status
Implementation	Informational	GovernerPlasma.sol L185	Resolved

Description:

The `_queueOrRevert` function in the `GovernerPlasma` contract makes a call to the `Timelock.queueTransaction` function and ignores the returned transaction hash:

```
timelock.queueTransaction(target, value, signature, data, eta);
```

Recommendation:

Consider if the transaction hash of the queued transaction is necessary and incorporate it into the system in some way. Otherwise consider removing the return value from the Timelock.queueTransaction function.

Alleviation:

The recommendation was applied in commit 573d47cd11660940fe4cd3896ecd16b545f29df9.

PPY-07: Inefficient loop over storage array

Type	Severity	Location	Status
Performance	Informational	GovernerPlasma.sol L192	Resolved

Description:

The `execute` function in the `GovernerPlasma` contract performs a loop over an address array from a storage pointer while querying the loop over each iteration, which is inefficient:

```
for (uint i = 0; i < proposal.targets.length; i++) {
```

Recommendation:

Consider storing the length of the proposal targets array in a local variable in order to save on the overall cost of gas:

```
uint256 targetsLength = proposal.targets.length;
for (uint256 i = 0; i < targetsLength; i++) {
```

Alleviation:

The recommendation was applied in commit [573d47cd11660940fe4cd3896ecd16b545f29df9](573d47cd11660940fe4cd3896ecd16b545f29df9).

PPY-08: Ignoring return data from executed transaction

Type	Severity	Location	Status
Implementation	Informational	GovernerPlasma.sol L193	Resolved

Description:

The `execute` function in the `GovernerPlasma` contract makes a call to the `Timelock.executeTransaction` function and ignores the data returned:

Recommendation:

Consider if the data returned from the `Timelock.executeTransaction` function is necessary and incorporate it into the system in some way.

Alleviation:

The recommendation was applied in commit 573d47cd11660940fe4cd3896ecd16b545f29df9.

PPY-09: Inefficient loop over storage array

Type	Severity	Location	Status
Performance	Informational	GovernerPlasma.sol L206	Resolved

Description:

The `cancel` function in the `GovernerPlasma` contract performs a loop over an address array from a storage pointer while querying the loop over each iteration, which is inefficient:

```
for (uint i = 0; i < proposal.targets.length; i++) {
```

Recommendation:

Consider storing the length of the proposal targets array in a local variable in order to save on the overall cost of gas:

```
uint256 targetsLength = proposal.targets.length;
for (uint256 i = 0; i < targetsLength; i++) {
```

Alleviation:

The recommendation was applied in commit [573d47cd11660940fe4cd3896ecd16b545f29df9](573d47cd11660940fe4cd3896ecd16b545f29df9).

PPY-10: Unnecessary add256 function

Type	Severity	Location	Status
Implementation	Informational	GovernerPlasma.sol L277-L281	Resolved

Description:

The `GovernerPlasma` contract defines an `add256` function to prevent addition overflow instead of using the `SafeMath.add` function.

Recommendation:

Remove the `add256` function, import the `SafeMath` contract and use its `add` function in place of the `add256` function.

Alleviation:

The recommendation was applied in commit [573d47cd11660940fe4cd3896ecd16b545f29df9](573d47cd11660940fe4cd3896ecd16b545f29df9).

PPY-11: Unnecessary sub256 function

Type	Severity	Location	Status
Implementation	Informational	GovernerPlasma.sol L283-286	Resolved

Description:

The `GovernerPlasma` contract defines a `sub256` function to prevent subtraction underflow instead of using the `SafeMath.add` function.

Recommendation:

Remove the `sub256` function, import the `SafeMath` contract and use its `sub` function in place of the `add256` function.

Alleviation:

The recommendation was applied in commit [573d47cd11660940fe4cd3896ecd16b545f29df9](573d47cd11660940fe4cd3896ecd16b545f29df9).

PPY-12: Ignoring return value from IPpay.transfer

Type	Severity	Location	Status
Implementation	Informational	PlasmaVesting.sol L55	Resolved

Description:

The `claim` function in the `PlasmaVesting` contract makes a call to the `IPpay.transfer` function without taking the boolean returned into account for the overall state of the function:

```
IPpay(ppay).transfer(recipient, amount);
```

Recommendation:

Consider if the value returned from the `IPpay.transfer` function is necessary and incorporate it into the system in some way. Otherwise consider removing the return value from the signature of the `IPpay.transfer` function.

Alleviation:

The recommendation was applied in commit 573d47cd11660940fe4cd3896ecd16b545f29df9.

PPY-13: totalSupply can be declared constant

Type	Severity	Location	Status
Implementation	Informational	Ppay.sol, L16	Resolved

Description:

The variable `totalSupply` in the `Ppay` contract can be declared `constant`, as it is unchanging throughout the code (as it should be according to contract logic).

Recommendation:

Change line 16 to `uint256 public constant totalSupply = 1_000_000_000e18;`

Alleviation:

The recommendation was applied in commit [573d47cd11660940fe4cd3896ecd16b545f29df9](573d47cd11660940fe4cd3896ecd16b545f29df9).

PPY-14: Minor re-entrancy issue in event emitting

Type	Severity	Location	Status
Control Flow	Informational	Timelock.sol L99, L102	Resolved

Description:

The `emit ExecuteTransaction` (102) occurs after the `target.call.value` line (99), which could re-enter. This means that if there is a re-entrancy, the emitted events will appear in a potentially misleading order (first-in-last-out rather than first-in-first-out)

Recommendation:

Move the `emit ExecuteTransaction` line (102) to before the `target.call.value` line (99)

Alleviation:

The recommendation was applied in commit 573d47cd11660940fe4cd3896ecd16b545f29df9.

PPY-15: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L38	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice  Unique id for looking up a proposal
uint256 id;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
//  Unique id for looking up a proposal
uint256 id;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-16: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L41	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice Creator of the proposal
address proposer;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// Creator of the proposal
address proposer;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-17: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L44	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice The timestamp that the proposal will be available for execution, set once the
vote succeeds
uint256 eta;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// The timestamp that the proposal will be available for execution, set once the vote
succeeds
uint256 eta;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-18: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L47	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice the ordered list of target addresses for calls to be made
address[] targets;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// the ordered list of target addresses for calls to be made
address[] targets;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-19: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L50	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice The ordered list of values (i.e. msg.value) to be passed to the calls to be made
uint256[] values;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// The ordered list of values (i.e. msg.value) to be passed to the calls to be made
uint256[] values;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-20: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L53	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice The ordered list of function signatures to be called
string[] signatures;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// The ordered list of function signatures to be called
string[] signatures;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-21: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L56	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice The ordered list of calldata to be passed to each call
bytes[] calldatas;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// The ordered list of calldata to be passed to each call
bytes[] calldatas;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-22: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L59	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice The block at which voting begins: holders must delegate their votes prior to
this block
uint256 startBlock;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// The block at which voting begins: holders must delegate their votes prior to this block
uint256 startBlock;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-23: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L62	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice The block at which voting ends: votes must be cast prior to this block
uint256 endBlock;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// The block at which voting ends: votes must be cast prior to this block
uint256 endBlock;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-24: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L65	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice Current number of votes in favor of this proposal
uint256 forVotes;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// Current number of votes in favor of this proposal
uint256 forVotes;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-25: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L68	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice Current number of votes in opposition to this proposal
uint256 againstVotes;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// Current number of votes in opposition to this proposal
uint256 againstVotes;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-26: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L71	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice Flag marking whether the proposal has been canceled
bool canceled;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// Flag marking whether the proposal has been canceled
bool canceled;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-27: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L74	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice Flag marking whether the proposal has been executed
bool executed;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// Flag marking whether the proposal has been executed
bool executed;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-28: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L77	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice Receipts of ballots for the entire set of voters
mapping (address => Receipt) receipts;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// Receipts of ballots for the entire set of voters
mapping (address => Receipt) receipts;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-29: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L83	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice Whether or not a vote has been cast
bool hasVoted;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// Whether or not a vote has been cast
bool hasVoted;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-30: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L86	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice Whether or not the voter supports the proposal
bool support;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// Whether or not the voter supports the proposal
bool support;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-31: Usage of docstring on structure field

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L89	Resolved

Description:

Only state variables can have a docstring. This will be disallowed in 0.7.0:

```
/// @notice The number of votes the voter had, which were cast
uint96 votes;
```

Recommendation:

Replace the docstring (`/// @notice`) with a regular comment (`//`) in order to retain the documentation of the field and silence the warning:

```
// The number of votes the voter had, which were cast
uint96 votes;
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-32: Usage of deprecated `.value(...)`

Type	Severity	Location	Status
Language Specific	Informational	GovernorPlasma.sol L201	Resolved

Description:

Using `.value(...)` is deprecated. Use `{value: ...}` instead.

```
timelock.executeTransaction.value(proposal.values[i])(proposal.targets[i],
proposal.values[i], proposal.signatures[i], proposal.calldatas[i], proposal.eta);
```

Recommendation:

Replace `.value(proposal.values[i])` with `{value: proposal.values[i]}`:

```
timelock.executeTransaction{value: proposal.values[i]}(proposal.targets[i],
proposal.values[i], proposal.signatures[i], proposal.calldatas[i], proposal.eta);
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-33: Usage of docstring on internal state variable

Type	Severity	Location	Status
Language Specific	Informational	Ppay.sol L21	Resolved

Description:

Documentation tag on non-public state variables will be disallowed in 0.7.0. You will need to use the @dev tag explicitly.

```
/// @notice Allowance amounts on behalf of others
```

Recommendation:

Replace the docstring (`/// @notice`) with a dev tag (`/// @dev`) in order to retain the documentation and silence the warning:

```
/// @dev Allowance amounts on behalf of others
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-34: Usage of docstring on internal state variable

Type	Severity	Location	Status
Language Specific	Informational	Ppay.sol L24	Resolved

Description:

Documentation tag on non-public state variables will be disallowed in 0.7.0. You will need to use the @dev tag explicitly.

```
/// @notice Official record of token balances for each account
```

Recommendation:

Replace the docstring (`/// @notice`) with a dev tag (`/// @dev`) in order to retain the documentation and silence the warning:

```
/// @dev Official record of token balances for each account
```

Alleviation:

The recommendation was applied in commit [539e8fe2cf6d2545a45b49402f26956706fb30ff](539e8fe2cf6d2545a45b49402f26956706fb30ff).

PPY-35: Usage of deprecated `.value(...)`

Type	Severity	Location	Status
Language Specific	Informational	Timelock.sol L102	Resolved

Description:

Using `.value(...)` is deprecated. Use `{value: ...}` instead.

```
(bool success, ) = target.call.value(value)(callData);
```

Recommendation:

Replace `.value(value)` with `{value: value}`:

```
(bool success, ) = target.call.value(value)(callData);
```

Alleviation:

The recommendation was applied in commit 539e8fe2cf6d2545a45b49402f26956706fb30ff.