Audit

By OCamlPro

August 17, 2021

Table of Major and Critical Issues

Contents

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Chapter 1

Introduction

1.0.1 Location

The Location section should be read as: The source code is available at `https://github.com/RSquad/dens-smv` at branch master with hash code equal to fbdfe4bca3c372b02cacf9788b4ad37112d0da2c and `https://github.com/RSquad/BFTG` (SMV part only) at branch master with hash code equal to 7c6ec7d811bcc1f228a3499ab19f6d20652ca94b

1.0.2 End Date

The contest ends at Aug 20, 2021, 23:59:59 UTC

Chapter 2

Overview

Chapter 3

Library Modules

3.1 Module "BFTG.sol"

3.1.1 Imports

../../BFTG/src/BftgRoot.sol	
../../BFTG/src/Padawan.sol	
../../BFTG/src/Proposal.sol	

3.2 Module "Errors.sol"

3.2.1 Pragmas

ton	-solidity >=0.37.0	

3.2.2 Contract Definitions

- Errors

3.3 Module "Glossary.sol"

3.3.1 Pragmas

ton	-solidity >= 0.36.0	

3.3.2 Type Definitions

3.3.2.1 Enum VoteCountModel

Undefined	
Majority	
SoftMajority	
SuperMajority	
Other	
Reserved	
Last	

```
3  enum VoteCountModel {
4      Undefined,
5      Majority,
6      SoftMajority,
7      SuperMajority,
8      Other,
9      Reserved,
10     Last
11 }
```

3.3.2.2 Enum ProposalType

Undefined	
SetCode	
Reserve	
SetOwner	
SetRootOwner	

```
13 enum ProposalType {
14     Undefined,
15     SetCode,
16     Reserve,
17     SetOwner,
18     SetRootOwner
19 }
```

3.3.2.3 Enum ProposalState

Undefined	
New	
OnVoting	
Ended	
Passed	
NotPassed	
Finalized	
Distributed	
Reserved	
Last	

```
21 enum ProposalState {
22     Undefined,
23     New,
24     OnVoting,
25     Ended,
26     Passed,
27     NotPassed,
28     Finalized,
29     Distributed,
30     Reserved,
31     Last
32 }
```

3.4 Module "IContest.sol"

3.4.1 Pragmas

ton	-solidity >= 0.42.0	

3.4.2 Type Definitions

3.4.2.1 Enum ContestStage

Undefined	
New	
Underway	
Voting	
Reveal	
Rank	
Reward	
Finish	
Last	

```
3  enum ContestStage {
4      Undefined,
5      New,
6      Underway,
7      Voting,
8      Reveal,
9      Rank,
10     Reward,
11     Finish,
12     Last
13 }
```

3.4.2.2 Struct Submission

id	uint32	
addrPartisipant	address	
forumLink	string	
fileLink	string	
hash	uint256	
createdAt	uint32	

```
15 struct Submission {
16   uint32 id;
17   address addrPartisipant;
18   string forumLink;
19   string fileLink;
20   uint hash;
21   uint32 createdAt;
22 }
```

3.4.2.3 Struct HiddenVote

submissionId	uint32	
hash	uint256	
hiddenComment	bytes	
hiddenScore	bytes	

```
24 struct HiddenVote {
25     uint32 submissionId;
26     uint hash;
27     bytes hiddenComment;
28     bytes hiddenScore;
29 }
```

3.4.2.4 Struct RevealVote

submissionId	uint32	
score	uint8	
comment	bytes	

```
31 struct RevealVote {
32     uint32 submissionId;
33     uint8 score;
34     bytes comment;
35 }
```

3.4.2.5 Struct Vote

addrJury	address	
score	uint8	
comment	bytes	

```
37 struct Vote {
38     address addrJury;
39     uint8 score;
40     bytes comment;
41 }
```

3.4.2.6 Struct Reward

total	uint128	
paid	uint128	

```
43 struct Reward {
44     uint128 total;
45     uint128 paid;
46 }
```

Chapter 4

Interface Modules

4.1 Module "IBftgRoot.sol"

4.1.1 Pragmas

ton	-solidity >= 0.42.0	

4.1.2 Type Definitions

4.1.2.1 Struct JuryGroupPending

addrJury	address	
tag	string	

```
3 struct JuryGroupPending {
4     address addrJury;
5     string tag;
6 }
```

4.1.3 Contract Definitions

- IBftgRoot

4.2 Module "IBftgRootStore.sol"

4.2.1 Pragmas

ton	-solidity >= 0.42.0	

4.2.2 Type Definitions

4.2.2.1 Enum ContractCode

JuryGroup	
Contest	

```
3  enum ContractCode {
4      JuryGroup,
5      Contest
6  }
```

4.2.2.2 Enum ContractAddr

empty	

```
8  enum ContractAddr {
9      empty
10 }
```

4.2.3 Contract Definitions

- IBftgRootStore
- IBftgRootStoreCallback

4.3 Module "IClient.sol"

4.3.1 Pragmas

ton	-solidity >= 0.36.0	

4.3.2 Imports

./IProposal.sol	
../Glossary.sol	

4.3.3 Contract Definitions

- IClient

4.4 Module "IGroup.sol"

4.4.1 Pragmas

ton	-solidity >= 0.36.0	

4.4.2 Contract Definitions

- IGroup
- IGroupCallback

4.5 Module "IJuryGroup.sol"

4.5.1 Pragmas

ton	-solidity >= 0.43.0	

4.5.2 Type Definitions

4.5.2.1 Struct Member

id	uint32	
balance	uint128	
addr	address	

```
3  struct Member {
4      uint32 id;
5      uint128 balance;
6      address addr;
7  }
```

4.5.3 Contract Definitions

- IJuryGroup
- IJuryGroupCallback

4.6 Module "IPadawan.sol"

4.6.1 Pragmas

ton	-solidity >= 0.36.0	

4.6.2 Imports

./IProposal.sol	

4.6.3 Type Definitions

4.6.3.1 Struct TipAccount

addr	address	
balance	uint128	

```
5  struct TipAccount {
6      address addr;
7      uint128 balance;
8  }
```

4.6.4 Contract Definitions

- IPadawan

4.7 Module "IProposal.sol"

4.7.1 Pragmas

ton	-solidity >= 0.36.0	

4.7.2 Imports

../Glossary.sol	

4.7.3 Type Definitions

4.7.3.1 Struct ProposalResults

id	uint32	
passed	bool	
votesFor	uint128	
votesAgainst	uint128	
totalVotes	uint256	
model	VoteCountModel	
ts	uint32	

```
5  struct ProposalResults {
6      uint32 id;
7      bool passed;
8      uint128 votesFor;
9      uint128 votesAgainst;
10     uint256 totalVotes;
11     VoteCountModel model;
12     uint32 ts;
13 }
```

4.7.3.2 Struct ProposalInfo

start	uint32	
end	uint32	
title	string	
proposalType	string	
specific	TvmCell	
state	ProposalState	
votesFor	uint128	
votesAgainst	uint128	
totalVotes	uint128	

```
15 struct ProposalInfo {
16     uint32 start;
17     uint32 end;
18     string title;
19     string proposalType;
```

```
20      TvmCell specific;
21      ProposalState state;
22      uint128 votesFor;
23      uint128 votesAgainst;
24      uint128 totalVotes;
25  }
```

4.7.4 Contract Definitions

- IProposal
- IEstimateVotesCallback

4.8 Module "ITokenRoot.sol"

4.8.1 Pragmas

ton	-solidity >= 0.42.0	

4.8.2 Contract Definitions

- ITokenRoot

4.9 Module "ITokenWallet.sol"

4.9.1 Pragmas

ton	-solidity >= 0.42.0	

4.9.2 Contract Definitions

- ITokenWallet

Chapter 5

Contract Modules

5.1 Module "Base.sol"

5.1.1 Pragmas

ton	-solidity >= 0.42.0	
msgValue	2e7	

5.1.2 Imports

./Errors.sol	

5.1.3 Contract Definitions

- Base

5.2 Module "BftgRoot.sol"

5.2.1 Pragmas

ton	-solidity >=0.36.0	
AbiHeader	expire	
AbiHeader	time	

5.2.2 Imports

./Base.sol	
./Checks.sol	
./Errors.sol	
./interfaces/IBftgRoot.sol	
./resolvers/ContestResolver.sol	
./resolvers/JuryGroupResolver.sol	

5.2.3 Contract Definitions

- BftgRoot

5.3 Module "Checks.sol"

5.3.1 Pragmas

ton	-solidity >= 0.42.0	

5.3.2 Contract Definitions

- Checks

5.4 Module "Contest.sol"

5.4.1 Pragmas

ton	-solidity >= 0.43.0	

5.4.2 Imports

./Checks.sol	
./interfaces/IContest.sol	
./interfaces/IBftgRoot.sol	
./interfaces/IBftgRootStore.sol	
./resolvers/JuryGroupResolver.sol	

5.4.3 Contract Definitions

- Contest

5.5 Module "ContestResolver.sol"

5.5.1 Pragmas

ton	-solidity >= 0.43.0	
AbiHeader	expire	
AbiHeader	time	

5.5.2 Imports

../Contest.sol	

5.5.3 Contract Definitions

- ContestResolver

5.6 Module "Group.sol"

5.6.1 Pragmas

ton	-solidity >= 0.36.0	
AbiHeader	expire	
AbiHeader	time	

5.6.2 Imports

./Base.sol	
./Errors.sol	
./interfaces/IGroup.sol	

5.6.3 Contract Definitions

- Group

5.7 Module "GroupResolver.sol"

5.7.1 Pragmas

ton	-solidity >= 0.36.0	
AbiHeader	expire	
AbiHeader	time	

5.7.2 Imports

../Group.sol	

5.7.3 Contract Definitions

- GroupResolver

5.8 Module "JuryGroup.sol"

5.8.1 Pragmas

ton	-solidity >= 0.36.0	

5.8.2 Imports

./interfaces/IJuryGroup.sol	

5.8.3 Contract Definitions

- JuryGroup

5.9 Module "JuryGroupResolver.sol"

5.9.1 Pragmas

ton	-solidity >= 0.42.0	

5.9.2 Imports

../JuryGroup.sol	

5.9.3 Contract Definitions

- JuryGroupResolver

5.10 Module "Padawan.sol"

5.10.1 Pragmas

ton	-solidity >= 0.36.0	
AbiHeader	expire	
AbiHeader	time	

5.10.2 Imports

./Base.sol	
./Errors.sol	
./interfaces/IProposal.sol	
./interfaces/IPadawan.sol	
./interfaces/ITokenRoot.sol	
./interfaces/ITokenWallet.sol	

5.10.3 Type Definitions

5.10.3.1 Struct PadawanData

ownerAddress	address	
addr	address	

```
12 struct PadawanData {
13     address ownerAddress;
14     address addr;
15 }
```

5.10.3.2 Struct Balance

total	uint128	
locked	uint128	

```
16 struct Balance {
17     uint128 total;
18     uint128 locked;
19 }
```

5.10.3.3 Struct ActiveProposal

voteProvider	address	
votePrice	uint128	
votes	uint128	

```
20 struct ActiveProposal {
21     address voteProvider;
22     uint128 votePrice;
```

```
23      uint128 votes;
24  }
```

5.10.3.4 Struct Reclaim

balanceProvider	address	
amount	uint128	
returnTo	address	

```
25  struct Reclaim {
26      address balanceProvider;
27      uint128 amount;
28      address returnTo;
29  }
```

5.10.4 Contract Definitions

- Padawan

5.11 Module "PadawanResolver.sol"

5.11.1 Pragmas

ton	-solidity >= 0.36.0	
AbiHeader	expire	
AbiHeader	time	

5.11.2 Imports

../Padawan.sol	

5.11.3 Contract Definitions

- PadawanResolver

5.12 Module "Proposal.sol"

5.12.1 Pragmas

ton	-solidity >= 0.36.0	
AbiHeader	expire	
AbiHeader	time	

5.12.2 Imports

./Base.sol	
./Errors.sol	
./resolvers/PadawanResolver.sol	
./resolvers/GroupResolver.sol	
./interfaces/IClient.sol	
./interfaces/IProposal.sol	
./interfaces/IPadawan.sol	
./interfaces/IGroup.sol	

5.12.3 Contract Definitions

- Proposal

Chapter 6

Contract Base

Contents

6.1 Overview

In file `Base.sol`

6.2 Constant Definitions

```
8     uint64 constant DEFAULT_FEE          = 1 ton;

10    uint16 constant ERROR_DIFFERENT_CALLER =  211;

12    uint64 constant START_BALANCE        = 3 ton;

13    uint64 constant DEPLOYER_FEE         = 0.1 ton;

14    uint64 constant PROCESS_FEE          = 0.3 ton;

15    uint64 constant VOTE_FEE             = 1 ton;

16    uint64 constant DEPLOY_FEE           = START_BALANCE +
          DEPLOYER_FEE;
```

```
17      uint64 constant DEPLOY_PAY          = DEPLOY_FEE + PROCESS_FEE;
18      uint64 constant DEPLOY_PROPOSAL_FEE = 3 ton;
19      uint64 constant DEPLOY_PROPOSAL_PAY = DEPLOY_PROPOSAL_FEE +
            PROCESS_FEE;
20      uint64 constant DEPOSIT_TONS_FEE    = 1 ton;
21      uint64 constant DEPOSIT_TONS_PAY    = DEPOSIT_TONS_FEE +
            PROCESS_FEE;
22      uint64 constant DEPOSIT_TOKENS_FEE  = 0.5 ton +
            DEPOSIT_TONS_FEE;
23      uint64 constant DEPOSIT_TOKENS_PAY  = DEPOSIT_TOKENS_FEE +
            PROCESS_FEE;
24      uint64 constant TOKEN_ACCOUNT_FEE   = 2 ton;
25      uint64 constant TOKEN_ACCOUNT_PAY   = TOKEN_ACCOUNT_FEE +
            PROCESS_FEE;
26      uint64 constant QUERY_STATUS_FEE    = 0.2 ton;
27      uint64 constant QUERY_STATUS_PAY    = QUERY_STATUS_FEE +
            DEF_RESPONSE_VALUE;
29      uint64 constant DEF_RESPONSE_VALUE = 0.03 ton;
30      uint64 constant DEF_COMPUTE_VALUE = 0.2 ton;
```

6.3 Modifier Definitions

6.3.1 Modifier signed

```
32      modifier signed {
33          require(msg.pubkey() == tvm.pubkey(), 100);
34          tvm.accept();
35          _;
36      }
```

6.3.2 Modifier accept

```
38      modifier accept {
39          tvm.accept();
40          _;
41      }
```

6.3.3 Modifier onlyContract

```
43      modifier onlyContract() {
44          require(msg.sender != address(0), Errors.ONLY_CONTRACT);
45          _;
46      }
```

6.3.4 Modifier onlyMe

```
48      modifier onlyMe {
49          require(msg.sender == address(this), ERROR_DIFFERENT_CALLER
                );
50          _;
51      }
```

Chapter 7

Contract BftgRoot

Contents

7.1 Overview

In file `BftgRoot.sol`

7.2 Contract Inheritance

Base	
IBftgRoot	
IBftgRootStoreCallback	
ContestResolver	
JuryGroupResolver	
Checks	

7.3 Constant Definitions

```
18     uint8 constant CHECK_CONTEST_CODE = 1;

19     uint8 constant CHECK_JURY_GROUP_CODE = 2;
```

7.4 Variable Definitions

address	_addrBftgRootStore	
		used in @1.BftgRoot.deployContest
		assigned in @1.BftgRoot.:constructor
		used in @1.BftgRoot.:constructor
bool	_inited	Initialized to false
		assigned in @1.BftgRoot._onInit
		used in @1.BftgRoot._onInit
		used in @1.BftgRoot._onInit
mapping (address => JuryGroupPending)	_juryGroupPendings	
		assigned in @1.BftgRoot.registerMemberJuryGroup
		used in @1.BftgRoot.registerMemberJuryGroup
		assigned in @1.BftgRoot.getMembersCallback
		used in @1.BftgRoot.getMembersCallback
		used in @1.BftgRoot.getMembersCallback
		used in @1.BftgRoot.getMembersCallback
		assigned in @1.BftgRoot.:onBounce
		used in @1.BftgRoot.:onBounce
		used in @1.BftgRoot.:onBounce
		used in @1.BftgRoot.:onBounce
		used in @1.BftgRoot.:onBounce
		used in @1.BftgRoot.:onBounce

```
34    address _addrBftgRootStore;

54    bool public _inited = false;

110   mapping(address => JuryGroupPending) _juryGroupPendings;
```

7.5 Modifier Definitions

7.5.1 Modifier onlyStore

```
29      modifier onlyStore() {
30          require(msg.sender == _addrBftgRootStore, Errors.ONLY_STORE
                );
31          _;
32      }
```

7.6 Constructor Definitions

7.6.1 Constructor

Critical issue: Constructor for BftgRoot (fake)

loren ipsum loren ipsum

- TODO

```
36      constructor(address addrBftgRootStore) public {
37          if (msg.sender == address(0)) {
38              require(msg.pubkey() == tvm.pubkey(), Errors.
                    ONLY_SIGNED);
39          }
40          require(addrBftgRootStore != address(0), Errors.
                STORE_UNDEFINED);
41          tvm.accept();
42
43          _addrBftgRootStore = addrBftgRootStore;
44          IBftgRootStore(addrBftgRootStore).queryCode
45              {value: 0.2 ton, bounce: true}
46              (ContractCode.Contest);
47          IBftgRootStore(addrBftgRootStore).queryCode
48              {value: 0.2 ton, bounce: true}
49              (ContractCode.JuryGroup);
50
51          _createChecks();
52      }
```

7.7 Public Method Definitions

7.7.1 OnBounce function

- TODO

```
83      onBounce(TvmSlice) external {
84          if(_juryGroupPendings.exists(msg.sender)) {
85              address[] _;
86              deployJuryGroup(_juryGroupPendings[msg.sender].tag, _);
87              this.registerMemberJuryGroup
88                  {value: 0, bounce: false, flag: 64}
```

```
89                 (_juryGroupPendings[msg.sender].tag,
                       _juryGroupPendings[msg.sender].addrJury);
90             delete _juryGroupPendings[msg.sender];
91         }
92     }
```

7.7.2 Function deployContest

- TODO

```
98     function deployContest(string[] tags, uint128 prizePool, uint32
           underwayDuration) external view {
99         tvm.accept();
100        TvmCell state = _buildContestState(address(this));
101        new Contest
102            {stateInit: state, value: 1 ton}
103            (_addrBftgRootStore, tags, prizePool, underwayDuration)
                   ;
104    }
```

7.7.3 Function deployJuryGroup

- TODO

```
112    function deployJuryGroup(string tag, address[] initialMembers)
           public view {
113        require(address(0) != msg.sender);
114        TvmCell state = _buildJuryGroupState(tag, address(this));
115        new JuryGroup
116            {stateInit: state, value: 0.3 ton}
117            (initialMembers);
118    }
```

7.7.4 Function getMembersCallback

- TODO

```
130    function getMembersCallback(mapping(address => Member) members)
           public {
131        require(_juryGroupPendings.exists(msg.sender) || address(
               this) == msg.sender, 106);
132        IJuryGroup(msg.sender).registerMember
133            {value: 0 ton, bounce: true, flag: 64}
134            (_juryGroupPendings[msg.sender].addrJury);
135        delete _juryGroupPendings[msg.sender];
136    }
```

7.7.5 Function getStored

- TODO

```
142     function getStored() public view returns (
143         TvmCell codeContest,
144         TvmCell codeJuryGroup
145     ) {
146         codeContest = _codeContest;
147         codeJuryGroup = _codeJuryGroup;
148     }
```

7.7.6 Function registerMemberJuryGroup

- TODO

```
120     function registerMemberJuryGroup(string tag, address addrMember
            ) public override {
121         address addrContest = resolveContest(address(this));
122         address addrJuryGroup = resolveJuryGroup(tag, address(this)
                );
123         require(msg.sender == addrContest || address(this) == msg.
                sender, 105);
124         _juryGroupPendings[addrJuryGroup] = JuryGroupPending(
                addrMember, tag);
125         IJuryGroup(addrJuryGroup).getMembers
126             {value: 0, bounce: true, flag: 64}
127             ();
128     }
```

7.7.7 Function updateAddr

- TODO

```
77      function updateAddr(ContractAddr kind, address addr) external
            override {}
```

7.7.8 Function updateCode

- TODO

```
62      function updateCode(
63          ContractCode kind,
64          TvmCell code
65      ) external override onlyStore {
66          if (kind == ContractCode.Contest) {
67              _codeContest = code;
68              _passCheck(CHECK_CONTEST_CODE);
69          }
70          if (kind == ContractCode.JuryGroup) {
71              _codeJuryGroup = code;
```

```
72              _passCheck(CHECK_JURY_GROUP_CODE);
73          }
74          _onInit();
75      }
```

7.8 Internal Method Definitions

7.8.1 Function _createChecks

- TODO

```
21      function _createChecks() private inline {
22          _checkList = CHECK_CONTEST_CODE | CHECK_JURY_GROUP_CODE;
23      }
```

7.8.2 Function _onInit

- TODO

```
56      function _onInit() private {
57          if(_isCheckListEmpty() && !_inited) {
58              _inited = true;
59          }
60      }
```

Chapter 8

Contract Checks

Contents

8.1 Overview

In file `Checks.sol`

8.2 Variable Definitions

uint8	_checkList	
		assigned in @1.BftgRoot._createChecks
		used in @1.BftgRoot._createChecks
		assigned in @18.Contest._createChecks
		used in @18.Contest._createChecks
		assigned in @5.Checks._passCheck
		used in @5.Checks._passCheck
		used in @5.Checks._isCheckListEmpty

```
4     uint8 _checkList;
```

8.3 Modifier Definitions

8.3.1 Modifier checksEmpty

```
12    modifier checksEmpty() {
13        require(_isCheckListEmpty(), 100); //Errors.
              NOT_ALL_CHECKS_PASSED);
14        tvm.accept();
15        _;
16    }
```

8.4 Internal Method Definitions

8.4.1 Function _isCheckListEmpty

- TODO

```
9     function _isCheckListEmpty() internal view inline returns (bool
          ) {
10        return (_checkList == 0);
11    }
```

8.4.2 Function _passCheck

- TODO

```
6       function _passCheck(uint8 check) internal inline {
7           _checkList &= ~check;
8       }
```

Chapter 9

Contract Contest

Contents

9.1 Overview

In file `Contest.sol`

9.2 Contract Inheritance

JuryGroupResolver	
IJuryGroupCallback	
IBftgRootStoreCallback	
Checks	

9.3 Constant Definitions

```
15      uint8 constant CHECK_JURY_GROUP_CODE = 1;
```

9.4 Static Variable Definitions

address	_deployer	
		used in @18.Contest.stakePartisipantReward
		used in @18.Contest._onInit
		used in @18.Contest.:constructor

```
28      address static _deployer;
```

9.5 Variable Definitions

string []	_tags	
		used in @ test.stakePartisipantRev
		used in @ test.stakePartisipantRev
		used in @18.Contest._on
		used in @18.Contest._on
		assigned in @ test.:constructor
		used in @18.Contest.:cor
mapping (address => bool)	_tagsPendings	
		used in @ test.getMembersCallbac
		assigned in @ test.getMembersCallbac
		used in @ test.getMembersCallbac
		used in @ test.getMembersCallbac
		assigned in @18.Contest
		used in @18.Contest._on
		used in @18.Contest.:on
		assigned in @ test.:onBounce
		used in @18.Contest.:on
		used in @18.Contest.:on
mapping (address => Member)	_jury	
		used in @18.Contest.vot
		used in @18.Contest.rev
		assigned in @ test.getMembersCallbac
		used in @ test.getMembersCallbac
uint128	_prizePool	
		used in @ test._calcPointValue
		assigned in @ test.:constructor
		used in @18.Contest.:cor
uint32	_underwayDuration	
		used in @ test._changeStage
		assigned in @ test.:constructor

uint32	_underwayEnds	
		assigned in @ test._changeStage
		used in @ test._changeStage
bool	_inited	Initialized to false
		assigned in @18.Contest

```
    string[] public _tags;
```

```
    mapping(address => bool) _tagsPendings;
```

```
    mapping(address => Member) public _jury;
```

```
    uint128 public _prizePool;
```

```
    uint32 public _underwayDuration;
```

```
    uint32 public _underwayEnds;
```

```
    bool public _inited = false;
```

```
    ContestStage public _stage;
```

```
    mapping(uint32 => Submission) public _submissions;
```

```
    uint32 _submissionsCounter;
```

```
    mapping(address => mapping(uint32 => HiddenVote)) public
        _juryHiddenVotes;
```

```
    mapping(uint32 => Vote[]) public _submissionVotes;
```

```
    uint128 _pointValue;
```

```
    mapping(address => Reward) public _rewards;
```

9.6 Constructor Definitions

9.6.1 Constructor

Critical issue: Constructor for Contest (fake)

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- TODO

```
    constructor(address addrBftgRootStore, string[] tags, uint128
        prizePool, uint32 underwayDuration) public {
        require(msg.sender == _deployer, 101);
        _tags = tags;
        _stage = ContestStage.New;
        _prizePool = prizePool;
        _underwayDuration = underwayDuration;
        IBftgRootStore(addrBftgRootStore).queryCode
            {value: 0.2 ton, bounce: true}
            (ContractCode.JuryGroup);
    }
```

9.7 Public Method Definitions

9.7.1 OnBounce function

- TODO

```
64      onBounce(TvmSlice) external {
65          if(_tagsPendings.exists(msg.sender)) {
66              delete _tagsPendings[msg.sender];
67              if(_tagsPendings.empty()) {
68                  _changeStage(ContestStage.Underway);
69              }
70          }
71      }
```

9.7.2 Function calcRewards

- TODO

```
175     function calcRewards() public {
176         _calcPointValue();
177         optional(uint32, Vote[]) optSubmissionVotes =
                _submissionVotes.min();
178         while (optSubmissionVotes.hasValue()) {
179             (uint32 id, Vote[] submissionVotes) =
                    optSubmissionVotes.get();
180             for(uint8 i = 0; i < submissionVotes.length; i++) {
181                 _rewards[_submissions[id].addrPartisipant].total +=
                        submissionVotes[i].score * _pointValue;
182             }
183             optSubmissionVotes = _submissionVotes.next(id);
184         }
185         _changeStage(ContestStage.Reward);
186     }
```

9.7.3 Function changeStage

- TODO

```
234     function changeStage(ContestStage stage) external {
235         tvm.accept();
236         _stage = stage;
237     }
```

9.7.4 Function claimPartisipantReward

- TODO

```
197     function claimPartisipantReward(uint128 amount) public {
198         require(_rewards.exists(msg.sender), 107);
199         require(_rewards[msg.sender].total - _rewards[msg.sender].
                paid >= amount, 108);
200         _rewards[msg.sender].paid += amount;
201         msg.sender.transfer(amount, true, 1);
202     }
```

9.7.5 Function getHiddenVotesByAddress

- TODO

```
145     function getHiddenVotesByAddress(address juryAddr) public view
            returns (mapping(uint32 => HiddenVote) hiddenVotes) {
146         hiddenVotes = _juryHiddenVotes[juryAddr];
147     }
```

9.7.6 Function getMembersCallback

- TODO

```
87      function getMembersCallback(mapping(address => Member) members)
             external override {
88          require(_tagsPendings.exists(msg.sender), 102);
89          delete _tagsPendings[msg.sender];
90          for((, Member member): members) {
91              if(member.balance >= 0) {
92                  _jury[member.addr] = member;
93              }
94          }
95          if(_tagsPendings.empty()) {
96              _changeStage(ContestStage.Underway);
97          }
98      }
```

9.7.7 Function hashVote

- TODO

```
223     function hashVote(uint32 submissionId, uint8 score, string
            comment) public pure returns (uint hash) {
224         TvmBuilder builder;
225         builder.store(submissionId, score, comment);
226         TvmCell cell = builder.toCell();
227         hash = tvm.hash(cell);
228     }
```

9.7.8 Function reveal

- TODO

```
155     function reveal(RevealVote[] revealVotes) external {
156         require(_stage == ContestStage.Reveal, 104);
157         require(_jury.exists(msg.sender), 105);
158         for(uint8 i = 0; i < revealVotes.length; i++) {
159             uint oldHash = _juryHiddenVotes[msg.sender][revealVotes
                    [i].submissionId].hash;
160             uint newHash = hashVote(revealVotes[i].submissionId,
                    revealVotes[i].score, revealVotes[i].comment);
161             require(oldHash == newHash, 106);
162             _submissionVotes[revealVotes[i].submissionId].push(Vote
                    (msg.sender, revealVotes[i].score, revealVotes[i].
                    comment));
163         }
164         msg.sender.transfer(0, true, 64);
165     }
```

9.7.9 Function stakePartisipantReward

- TODO

```
204     function stakePartisipantReward(uint128 amount, string tag,
            address addrJury) public {
205         require(_rewards.exists(msg.sender), 107);
206         require(_rewards[msg.sender].total - _rewards[msg.sender].
                paid >= amount, 108);
207         bool isTagExists = false;
208         for(uint8 i = 0; i < _tags.length; i++) {
209             if(_tags[i] == tag) isTagExists = true;
210         }
211         require(isTagExists, 108);
212         _rewards[msg.sender].paid += amount;
213         IBftgRoot(_deployer).registerMemberJuryGroup
214             {value: amount, bounce: true, flag: 2}
215             (tag, addrJury == address(0) ? msg.sender : addrJury);
216         msg.sender.transfer(0, true, 64);
217     }
```

9.7.10 Function submit

- TODO

```
121     function submit(address addrPartisipant, string forumLink,
            string fileLink, uint hash) external {
122         require(_stage == ContestStage.Underway, 104);
123         _submissions[_submissionsCounter] = (Submission(
                _submissionsCounter, addrPartisipant, forumLink,
                fileLink, hash, uint32(now)));
124         _submissionsCounter += 1;
125         msg.sender.transfer(0, true, 64);
126     }
```

9.7.11 Function updateAddr

- TODO

```
81      function updateAddr(ContractAddr kind, address addr) external
            override {}
```

9.7.12 Function updateCode

- TODO

```
73      function updateCode(ContractCode kind, TvmCell code) external
            override {
74          if (kind == ContractCode.JuryGroup) {
75              _codeJuryGroup = code;
76              _passCheck(CHECK_JURY_GROUP_CODE);
77          }
78          _onInit();
79      }
```

9.7.13 Function vote

- TODO

```
134     function vote(HiddenVote[] hiddenVotes) external {
135         require(_stage == ContestStage.Voting, 104);
136         require(_jury.exists(msg.sender), 105);
137         for(uint8 i = 0; i < hiddenVotes.length; i++) {
138             if(!_juryHiddenVotes[msg.sender].exists(hiddenVotes[i].
                    submissionId)) {
139                 _juryHiddenVotes[msg.sender][hiddenVotes[i].
                        submissionId] = hiddenVotes[i];
140             }
141         }
142         msg.sender.transfer(0, true, 64);
143     }
```

9.8 Internal Method Definitions

9.8.1 Function _calcPointValue

- TODO

```
188     function _calcPointValue() private inline {
189         // TODO: change the formula
190         _pointValue = _prizePool / (_submissionsCounter * 10);
191     }
```

9.8.2 Function _changeStage

- TODO

```
106     function _changeStage(ContestStage stage) private inline
            returns (ContestStage) {
107         require(_stage < stage, 103);
108         if (stage == ContestStage.Underway) {
109             _underwayEnds = uint32(now) + _underwayDuration;
110         }
111         _stage = stage;
112     }
```

9.8.3 Function _createChecks

- TODO

```
17      function _createChecks() private inline {
18          _checkList = CHECK_JURY_GROUP_CODE;
19      }
```

9.8.4 Function _onInit

- TODO

```
47      function _onInit() private {
48          if(_isCheckListEmpty() && !_inited) {
49              _inited = true;
50              for(uint8 i = 0; i < _tags.length; i++) {
51                  TvmCell state = _buildJuryGroupState(_tags[i],
                        _deployer);
52                  uint256 hashState = tvm.hash(state);
53                  address addrJuryGroup = address.makeAddrStd(0,
                        hashState);
54                  _tagsPendings[addrJuryGroup] = true;
55                  IJuryGroup(addrJuryGroup).getMembers{
56                      value: 0.2 ton,
57                      flag: 1,
58                      bounce: true
59                  }();
60              }
61          }
62      }
```

Chapter 10

Contract ContestResolver

Contents

10.1 Overview

In file `ContestResolver.sol`

10.2 Variable Definitions

TvmCell	_codeContest	
		assigned in @1.BftgRoot.updateCode
		used in @1.BftgRoot.updateCode
		used in @1.BftgRoot.getStored
		used in @8.ContestResolver._buildContestState

```
8     TvmCell _codeContest;
```

10.3 Public Method Definitions

10.3.1 Function resolveContest

- TODO

```
10      function resolveContest(address deployer) public view returns (
            address addrContest) {
11          TvmCell state = _buildContestState(deployer);
12          uint256 hashState = tvm.hash(state);
13          addrContest = address.makeAddrStd(0, hashState);
14      }
```

10.4 Internal Method Definitions

10.4.1 Function _buildContestState

- TODO

```
16      function _buildContestState(address deployer) internal virtual
            view returns (TvmCell) {
17          return tvm.buildStateInit({
18              contr: Contest,
19              varInit: {_deployer: deployer},
20              code: _codeContest
21          });
22      }
```

Chapter 11

Contract Group

Contents

11.1 Overview

In file `Group.sol`

11.2 Contract Inheritance

Base	
IGroup	

11.3 Static Variable Definitions

string	_name	
		used in @21.Group.getMembers

```
11      string static _name;
```

11.4 Variable Definitions

address []	_members	
		assigned in @21.Group.removeMember
		used in @21.Group.removeMember
		used in @21.Group.removeMember
		used in @21.Group.removeMember
		used in @21.Group.removeMember
		used in @21.Group.getMembers
		used in @21.Group.addMember
		assigned in @21.Group.:constructor
		used in @21.Group.:constructor

```
    address[] _members;
```

11.5 Constructor Definitions

11.5.1 Constructor

Critical issue: Constructor for Group (fake)

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- TODO

```
    constructor(address[] initialMembers) public onlyContract {
        _members = initialMembers;
    }
```

11.6 Public Method Definitions

11.6.1 Function addMember

- TODO

```
25      function addMember(uint128 idProposal, address member) public
            onlyContract {
26          idProposal;
27          _members.push(member);
28      }
```

11.6.2 Function getMembers

- TODO

```
19      function getMembers() override public onlyContract {
20          IGroupCallback(msg.sender).onGetMembers
21              {value: 0, flag: 64, bounce: true}
22              (_name, _members);
23      }
```

11.6.3 Function removeMember

- TODO

```
30      function removeMember(uint128 idProposal, address member)
            public onlyContract {
31          idProposal;
32          address[] members;
33          for(uint32 index = 0; index < _members.length; index++) {
34              if(_members[index] != member) {
35                  members.push(_members[index]);
36              }
37          }
38          _members = members;
39      }
```

Chapter 12

Contract GroupResolver

Contents

12.1 Overview

In file `GroupResolver.sol`

12.2 Variable Definitions

TvmCell	_codeGroup	
		used in @16.GroupResolver._buildGroupState

```
8     TvmCell _codeGroup;
```

12.3 Public Method Definitions

12.3.1 Function resolveGroup

- TODO

```
10      function resolveGroup(string name) public view returns (address
            group) {
11          TvmCell state = _buildGroupState(name);
12          uint256 hashState = tvm.hash(state);
13          group = address.makeAddrStd(0, hashState);
14      }
```

12.4 Internal Method Definitions

12.4.1 Function _buildGroupState

- TODO

```
16      function _buildGroupState(string name) internal virtual view
            returns (TvmCell) {
17          return tvm.buildStateInit({
18              contr: Group,
19              varInit: {_name: name},
20              code: _codeGroup
21          });
22      }
```

Chapter 13

Contract JuryGroup

Contents

13.1 Overview

In file `JuryGroup.sol`

13.2 Contract Inheritance

IJuryGroup	

13.3 Static Variable Definitions

string	_tag	
address	_deployer	
		used in @19.JuryGroup.:constructor

```
11     string static public _tag;
```

```
12     address static _deployer;
```

13.4 Variable Definitions

mapping (address => Member)	_members	
		assigned in @19.JuryGroup.withdraw
		used in @19.JuryGroup.withdraw
		used in @19.JuryGroup.withdraw
		used in @19.JuryGroup.withdraw
		assigned in @19.JuryGroup.registerMember
		used in @19.JuryGroup.registerMember
		used in @19.JuryGroup.registerMember
		used in @19.JuryGroup.getMembers
		assigned in @19.JuryGroup._addMember
		used in @19.JuryGroup._addMember
uint32	_membersCounter	
		assigned in @19.JuryGroup._addMember
		used in @19.JuryGroup._addMember
		used in @19.JuryGroup._addMember

```
14     mapping(address => Member) public _members;
```

```
15     uint32 _membersCounter;
```

13.5 Modifier Definitions

13.5.1 Modifier onlyDeployer

```
    modifier onlyDeployer() {
        require(msg.sender == _deployer, 100);
        _;
    }
```

13.6 Constructor Definitions

13.6.1 Constructor

Critical issue: Constructor for JuryGroup (fake)

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- TODO

```
    constructor(address[] initialMembers) public {
        require(_deployer == msg.sender, 100);
        for(uint8 i = 0; i < initialMembers.length; i++) {
            _addMember(initialMembers[i], 0);
        }
    }
```

13.7 Public Method Definitions

13.7.1 Function getMembers

- TODO

```
    function getMembers() public override {
        IJuryGroupCallback(msg.sender).getMembersCallback{value: 0,
             flag: 64, bounce: false}(_members);
    }
```

13.7.2 Function registerMember

- TODO

```
    function registerMember(address addrMember) public override
        onlyDeployer {
        if(_members.exists(addrMember) == false) {
```

```
26              _addMember(addrMember, msg.value);
27          } else {
28              _members[addrMember].balance += msg.value;
29          }
30      }
```

13.7.3 Function withdraw

- TODO

```
37      function withdraw(uint128 amount) public {
38          require(msg.sender != address(0), 101);
39          require(_members[msg.sender].balance >= 0 ton, 201);
40          require(_members[msg.sender].balance < amount, 202);
41          msg.sender.transfer(amount, true, 1);
42          _members[msg.sender].balance -= amount;
43      }
```

13.8 Internal Method Definitions

13.8.1 Function _addMember

- TODO

```
32      function _addMember(address addrMember, uint128 value) private
            inline {
33          _members[addrMember] = Member(_membersCounter, value,
                addrMember);
34          _membersCounter++;
35      }
```

Chapter 14

Contract JuryGroupResolver

Contents

14.1 Overview

In file `JuryGroupResolver.sol`

14.2 Variable Definitions

TvmCell	_codeJuryGroup	
		assigned in @1.BftgRoot.updateCode
		used in @1.BftgRoot.updateCode
		used in @1.BftgRoot.getStored
		assigned in @18.Contest.updateCode
		used in @18.Contest.updateCode
		used in @9.JuryGroupResolver._buildJuryGroupState

```
6       TvmCell _codeJuryGroup;
```

14.3 Public Method Definitions

14.3.1 Function resolveJuryGroup

- TODO

```
8       function resolveJuryGroup(string tag, address deployer) public
            view returns (address addrJuryGroup) {
9           TvmCell state = _buildJuryGroupState(tag, deployer);
10          uint256 hashState = tvm.hash(state);
11          addrJuryGroup = address.makeAddrStd(0, hashState);
12      }
```

14.4 Internal Method Definitions

14.4.1 Function _buildJuryGroupState

- TODO

```
14      function _buildJuryGroupState(string tag, address deployer)
            internal view returns (TvmCell) {
15          return tvm.buildStateInit({
16              contr: JuryGroup,
17              varInit: {_tag: tag, _deployer: deployer},
18              code: _codeJuryGroup
19          });
20      }
```

Chapter 15

Contract Padawan

Contents

15.1 Overview

In file `Padawan.sol`

15.2 Contract Inheritance

Base	
IEstimateVotesCallback	

15.3 Static Variable Definitions

address	_deployer	
		used in @2.Padawan.:constructor
address	_owner	
		used in @2.Padawan.rejectVote
		used in @2.Padawan.onTokenWalletDeploy
		used in @2.Padawan.onEstimateVotes
		used in @2.Padawan.confirmVote
		used in @2.Padawan._doReclaim

```
32     address static _deployer;

33     address static _owner;
```

15.4 Variable Definitions

mapping (address => Balance)	_balances	
		used in @2.Padawan.updateStatus
		assigned in @2.Padawan.updateStatus
		used in @2.Padawan.updateStatus
		used in @2.Padawan.updateStatus
		used in @2.Padawan.reclaimDeposit
		assigned in @2.Padawan.onTokenWalletGetBalance
		used in @2.Padawan.onTokenWalletGetBalance
		used in @2.Padawan.onTokenWalletGetBalance
		assigned in @2.Padawan.onTokenWalletDeploy
		used in @2.Padawan.onTokenWalletDeploy
		used in @2.Padawan.onEstimateVotes
		used in @2.Padawan.onEstimateVotes
		assigned in @2.Padawan.depositTons
		used in @2.Padawan.depositTons
		assigned in @2.Padawan.confirmVote
		used in @2.Padawan.confirmVote
		used in @2.Padawan.confirmVote
		assigned in @2.Padawan._doReclaim
		used in @2.Padawan._doReclaim
mapping (address => address)	_tokenAccounts	
		used in @2.Padawan.updateStatus
		used in @2.Padawan.reclaimDeposit
		assigned in @2.Padawan.onTokenWalletDeploy
		used in @2.Padawan.onTokenWalletDeploy
		used in @2.Padawan.onTokenWalletDeploy
		used in @2.Padawan.onEstimateVotes
		used in @2.Padawan.depositTokens

```
    mapping(address => Balance) public _balances;

    mapping(address => address) public _tokenAccounts;

    mapping(address => ActiveProposal) public _activeProposals;

    uint32 _activeProposalsLength;

    Reclaim public _reclaim;
```

15.5 Modifier Definitions

15.5.1 Modifier onlyOwner

```
    modifier onlyOwner() {
        require(msg.sender == _owner, Errors.
            NOT_AUTHORIZED_CONTRACT);
        _;
    }
```

15.6 Constructor Definitions

15.6.1 Constructor

Critical issue: Constructor for Padawan (fake)

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- TODO

```
    constructor() public onlyContract {
        require(_deployer == msg.sender, Errors.ONLY_DEPLOYER);
    }
```

15.7 Public Method Definitions

15.7.1 Function confirmVote

- TODO

```
89      function confirmVote(
90          uint128 votes,
91          uint128 votePrice,
92          address voteProvider)
93      external onlyContract { votes;
94          optional(ActiveProposal) optActiveProposal =
                _activeProposals.fetch(msg.sender);
95          require(optActiveProposal.hasValue(), 111);
96          uint128 activeProposalVotes = optActiveProposal.get().votes
                ;
97
98          address balanceProvider = voteProvider == address(0) ?
                voteProvider : _tokenAccounts[voteProvider];
99
100         if(_balances[balanceProvider].locked < (activeProposalVotes
                ) * votePrice) {
101             _balances[balanceProvider].locked = (
                    activeProposalVotes) * votePrice;
102         }
103         _owner.transfer(0, false, 64);
104     }
```

15.7.2 Function createTokenAccount

- TODO

```
228     function createTokenAccount(address tokenRoot) external
            onlyOwner {
229         require(msg.value >= DEFAULT_FEE, Errors.MSG_VALUE_TOO_LOW)
                ;
230         require(!_tokenAccounts.exists(tokenRoot));
231
232         ITokenRoot(tokenRoot).deployEmptyWallet
233             {value: 0, flag: 64, bounce: true}
234             (tvm.functionId(onTokenWalletDeploy), 0, 0, address(
                    this).value, 1 ton);
235     }
```

15.7.3 Function depositTokens

- TODO

```
210     function depositTokens(address tokenRoot) external onlyOwner {
211         require(msg.value >= DEFAULT_FEE, Errors.MSG_VALUE_TOO_LOW)
                ;
212         optional(address) optTokenAccount = _tokenAccounts.fetch(
                tokenRoot);
213         require(optTokenAccount.hasValue(), Errors.
                ACCOUNT_DOES_NOT_EXIST);
214
215         address tokenAccount = optTokenAccount.get();
216
217         ITokenWallet(tokenAccount).getBalance_InternalOwner
```

```
218             {value: 0, flag: 64, bounce: true}
219             (tvm.functionId(onTokenWalletGetBalance));
220     }
```

15.7.4 Function depositTons

- TODO

```
204     function depositTons(uint128 tons) external onlyOwner {
205         require(msg.value >= tons + 1 ton);
206         _balances[address(0)].total += tons;
207         // _owner.transfer(0, false, 64);
208     }
```

15.7.5 Function onEstimateVotes

- TODO

```
60      function onEstimateVotes(
61          uint128 cost,
62          uint128 votePrice,
63          address voteProvider,
64          uint128 votes,
65          bool choice)
66      external override onlyContract {
67          optional(ActiveProposal) optActiveProposal =
                _activeProposals.fetch(msg.sender);
68          ActiveProposal activeProposal = optActiveProposal.hasValue
                () ? optActiveProposal.get() : ActiveProposal(
                voteProvider, votePrice, 0);
69          if(!optActiveProposal.hasValue()) {
70              _activeProposals[msg.sender] = activeProposal;
71          }
72          optional(Balance) optBalance;
73          if(voteProvider == address(0)) {
74              optBalance = _balances.fetch(voteProvider);
75          } else {
76              optional(address) optAccount = _tokenAccounts.fetch(
                    voteProvider);
77              require(optAccount.hasValue(), 115);
78              optBalance = _balances.fetch(optAccount.get());
79          }
80          require(optBalance.hasValue(), 113);
81          require(optBalance.get().total >= (activeProposal.votes *
                votePrice) + cost, 114);
82          _activeProposals[msg.sender].votes += votes;
83          _activeProposalsLength += 1;
84          IProposal(msg.sender).vote
85              {value: 0, flag: 64, bounce: true}
86              (_owner, choice, votes);
87      }
```

15.7.6 Function onTokenWalletDeploy

- TODO

```
237     function onTokenWalletDeploy(address account) public {
238         require(!_tokenAccounts.exists(msg.sender), Errors.
                INVALID_CALLER);
239         _tokenAccounts[msg.sender] = account;
240         _balances[account] = Balance(0, 0);
241         _owner.transfer(0, false, 64);
242     }
```

15.7.7 Function onTokenWalletGetBalance

- TODO

```
222     function onTokenWalletGetBalance(uint128 balance) public
            onlyContract {
223         optional(Balance) optBalance = _balances.fetch(msg.sender);
224         require(optBalance.hasValue(), Errors.
                NOT_AUTHORIZED_CONTRACT);
225         _balances[msg.sender].total += balance;
226     }
```

15.7.8 Function reclaimDeposit

- TODO

```
118     function reclaimDeposit(address voteProvider, uint128 amount,
            address returnTo) external onlyOwner {
119         require(_reclaim.amount == 0, 130);
120         require(msg.value >= QUERY_STATUS_FEE *
                _activeProposalsLength + 1 ton, Errors.
                MSG_VALUE_TOO_LOW);
121         address balanceProvider = address(0);
122         if(voteProvider != address(0)) {
123             optional(address) optAccount = _tokenAccounts.fetch(
                    voteProvider);
124             require(optAccount.hasValue(), 117);
125             balanceProvider = optAccount.get();
126         }
127         optional(Balance) optBalance = _balances.fetch(
                balanceProvider);
128         require(optBalance.hasValue(), 131);
129         Balance balance = optBalance.get();
130         require(amount <= balance.total, Errors.NOT_ENOUGH_VOTES);
131         require(returnTo != address(0), 132);
132
133         _reclaim = Reclaim(balanceProvider, amount, returnTo);
134
135         if (amount <= balance.total - balance.locked) {
136             _doReclaim();
137         }
```

```
138
139         optional(address, ActiveProposal) optActiveProposal =
                _activeProposals.min();
140         while (optActiveProposal.hasValue()) {
141             (address addrActiveProposal,) = optActiveProposal.get()
                    ;
142             IProposal(addrActiveProposal).queryStatus
143                 {value: QUERY_STATUS_FEE, bounce: true, flag: 1}
144                 ();
145             optActiveProposal = _activeProposals.next(
                    addrActiveProposal);
146         }
147     }
```

15.7.9 Function rejectVote

- TODO

```
106     function rejectVote(uint128 votes, uint16 errorCode) external
            onlyContract { votes; errorCode;
107         optional(ActiveProposal) optActiveProposal =
                _activeProposals.fetch(msg.sender);
108         require(optActiveProposal.hasValue(), 112);
109         ActiveProposal activeProposal = optActiveProposal.get();
110         activeProposal.votes -= votes;
111         if (activeProposal.votes == 0) {
112             delete _activeProposals[msg.sender];
113             _activeProposalsLength -= 1;
114         }
115         _owner.transfer(0, false, 64);
116     }
```

15.7.10 Function updateStatus

- TODO

```
149     function updateStatus(ProposalState state) external
            onlyContract {
150         optional(ActiveProposal) optActiveProposal =
                _activeProposals.fetch(msg.sender);
151         require(optActiveProposal.hasValue());
152         ActiveProposal activeProposal = optActiveProposal.get();
153
154         if (state >= ProposalState.Ended) {
155             address balanceProvider = address(0);
156             if(activeProposal.voteProvider != address(0)) {
157                 optional(address) optAccount = _tokenAccounts.fetch
                        (activeProposal.voteProvider);
158                 require(optAccount.hasValue(), 117);
159                 balanceProvider = optAccount.get();
160             }
161             Balance balance = _balances[balanceProvider];
162             if(balance.locked <= activeProposal.votes *
                    activeProposal.votePrice) {
```

```
163                 delete _activeProposals[msg.sender];
164                 uint128 max;
165                 optional(address, ActiveProposal)
                        optActiveProposal2 = _activeProposals.min();
166                 while (optActiveProposal2.hasValue()) {
167                     (address addrActiveProposal, ActiveProposal
                            activeProposal2) = optActiveProposal2.get()
                            ;
168                     if(activeProposal2.votes * activeProposal2.
                            votePrice > max && activeProposal2.
                            voteProvider == activeProposal.voteProvider
                            ) {
169                         max = activeProposal2.votes *
                                activeProposal2.votePrice;
170                     }
171                     optActiveProposal2 = _activeProposals.next(
                            addrActiveProposal);
172                 }
173                 _balances[balanceProvider].locked = max;
174             } else {
175                 delete _activeProposals[msg.sender];
176             }
177             _activeProposalsLength -= 1;
178             if(_reclaim.amount != 0) {
179                 balance = _balances[_reclaim.balanceProvider];
180                 if (_reclaim.amount <= balance.total - balance.
                        locked) {
181                     _doReclaim();
182                 }
183             }
184         }
185     }
```

15.7.11 Function vote

- TODO

```
53     function vote(address proposal, bool choice, uint128 votes)
           external onlyOwner {
54         require(msg.value >= VOTE_FEE, Errors.MSG_VALUE_TOO_LOW);
55         IProposal(proposal).estimateVotes
56             {value: 0, flag: 64, bounce: true}
57             (votes, choice);
58     }
```

15.8 Internal Method Definitions

15.8.1 Function _doReclaim

- TODO

```
191     function _doReclaim() private inline {
192         if(_reclaim.balanceProvider == address(0)) {
193             _reclaim.returnTo.transfer(_reclaim.amount, true, 1);
194         } else {
195             ITokenWallet(_reclaim.balanceProvider).transfer
196                 {value: 0.2 ton} // refactor
197                 (_reclaim.returnTo, _reclaim.amount, 0.1 ton);
198         }
199         _balances[_reclaim.balanceProvider].total -= _reclaim.
                amount;
200         delete _reclaim;
201         _owner.transfer(0, false, 64);
202     }
```

Chapter 16

Contract PadawanResolver

Contents

16.1 Overview

In file `PadawanResolver.sol`

16.2 Variable Definitions

TvmCell	_codePadawan	
		used in @3.Proposal._buildPadawanState
		assigned in @3.Proposal.:constructor
		used in @3.Proposal.:constructor
		used in @17.PadawanResolver._buildPadawanState

```
8     TvmCell _codePadawan;
```

16.3 Public Method Definitions

16.3.1 Function resolvePadawan

- TODO

```
10      function resolvePadawan(address owner) public view returns (
            address addrPadawan) {
11          TvmCell state = _buildPadawanState(owner);
12          uint256 hashState = tvm.hash(state);
13          addrPadawan = address.makeAddrStd(0, hashState);
14      }
```

16.4 Internal Method Definitions

16.4.1 Function _buildPadawanState

- TODO

```
16      function _buildPadawanState(address owner) internal virtual
            view returns (TvmCell) {
17          return tvm.buildStateInit({
18              contr: Padawan,
19              varInit: {_deployer: address(this), _owner: owner},
20              code: _codePadawan
21          });
22      }
```

Chapter 17

Contract Proposal

Contents

17.1 Overview

In file `Proposal.sol`

17.2 Contract Inheritance

Base	
PadawanResolver	
GroupResolver	
IProposal	
IGroupCallback	

17.3 Static Variable Definitions

address	_deployer	
		used in @3.Proposal._buildPadawanState
		used in @3.Proposal.:constructor
uint32	_id	

```
15    address static _deployer;

16    uint32 static _id;
```

17.4 Variable Definitions

address	_client	
		used in @3.Proposal._finalize
		assigned in @3.Proposal.:constructor
		used in @3.Proposal.:constructor
uint128	_votePrice	
		used in @3.Proposal.vote
		used in @3.Proposal.estimateVotes
		used in @3.Proposal.estimateVotes
		assigned in @3.Proposal.:constructor
		used in @3.Proposal.:constructor
uint128	_voteTotal	
		used in @3.Proposal._tryEarlyComplete
		used in @3.Proposal._tryEarlyComplete
		used in @3.Proposal._softMajority
		used in @3.Proposal._softMajority
		used in @3.Proposal._softMajority
		used in @3.Proposal._softMajority
		used in @3.Proposal._finalize
		assigned in @3.Proposal.:constructor
		used in @3.Proposal.:constructor
address	_voteProvider	
		used in @3.Proposal.vote
		used in @3.Proposal.estimateVotes
		assigned in @3.Proposal.:constructor
		used in @3.Proposal.:constructor
address []	_whiteList	
		assigned in @3.Proposal.onGetMembers
		used in @3.Proposal.onGetMembers
		used in @3.Proposal._findInWhiteList
		used in @3.Proposal._findInWhiteList
		assigned in @3.Proposal.:constructor
		used in @3.Proposal.:constructor
bool	_openProposal	Initialized to false
		used in @3.Proposal.vote

```
    address _client;

    uint128 _votePrice;

    uint128 _voteTotal;

    address _voteProvider;

    address[] _whiteList;

    bool _openProposal = false;

    ProposalInfo _proposalInfo;

    ProposalResults _results;

    VoteCountModel _voteCountModel;
```

17.5 Constructor Definitions

17.5.1 Constructor

Critical issue: Constructor for Proposal (fake)

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- TODO

```
    constructor(
        address client,
        string title,
        uint128 votePrice,
        uint128 voteTotal,
        address voteProvider,
        address group,
        address[] whiteList,
        string proposalType,
        TvmCell specific,
        TvmCell codePadawan
    ) public {
        require(_deployer == msg.sender);

        _client = client;

        _votePrice = votePrice;
        _voteTotal = voteTotal;
        _voteProvider = voteProvider;

```

```
52          _proposalInfo.title = title;
53          _proposalInfo.start = uint32(now);
54          _proposalInfo.end = uint32(now + 60 * 60 * 24 * 7);
55          _proposalInfo.proposalType = proposalType;
56          _proposalInfo.specific = specific;
57          _proposalInfo.state = ProposalState.New;
58          _proposalInfo.totalVotes = voteTotal;
59
60          _codePadawan = codePadawan;
61
62          if(group != address(0)) {
63              _getGroupMembers(group);
64          } else if (!whiteList.empty()) {
65              _whiteList = whiteList;
66          } else  {
67              _openProposal = true;
68          }
69
70          _voteCountModel = VoteCountModel.SoftMajority;
71      }
```

17.6 Public Method Definitions

17.6.1 Function estimateVotes

- TODO

```
78      function estimateVotes(uint128 votes, bool choice) external
            override {
79          IEstimateVotesCallback(msg.sender).onEstimateVotes
80              {value: 0, flag: 64, bounce: true}
81              (votes * _votePrice, _votePrice, _voteProvider, votes,
                    choice);
82      }
```

17.6.2 Function getAll

- TODO

```
199     function getAll() public view override returns (ProposalInfo
            info) {
200         info = _proposalInfo;
201     }
```

17.6.3 Function getCurrentVotes

- TODO

```
212     function getCurrentVotes() external override view returns (
            uint128 votesFor, uint128 votesAgainst) {
213         return (_proposalInfo.votesFor, _proposalInfo.votesAgainst)
                ;
214     }
```

17.6.4 Function getInfo

- TODO

```
208     function getInfo() public view returns (ProposalInfo info) {
209         info = _proposalInfo;
210     }
```

17.6.5 Function getVotingResults

- TODO

```
203     function getVotingResults() public view returns (
            ProposalResults vr) {
204         require(_proposalInfo.state > ProposalState.Ended, Errors.
                VOTING_HAS_NOT_ENDED);
205         vr = _results;
206     }
```

17.6.6 Function onGetMembers

- TODO

```
220     function onGetMembers(string name, address[] members) public
            override onlyContract { name;
221         _whiteList = members;
222     }
```

17.6.7 Function queryStatus

- TODO

```
191     function queryStatus() external override {
192         IPadawan(msg.sender).updateStatus
193             {value: 0, flag: 64, bounce: true}
194             (_proposalInfo.state);
195     }
```

17.6.8 Function vote

- TODO

```
84      function vote(address padawanOwner, bool choice, uint128 votes)
            external override {
85          address addrPadawan = resolvePadawan(padawanOwner);
86          uint16 errorCode = 0;
87
88          require(_openProposal || _findInWhiteList(padawanOwner),
                Errors.INVALID_CALLER);
89
90          if (addrPadawan != msg.sender) {
91              errorCode = Errors.NOT_AUTHORIZED_CONTRACT;
92          } else if (now < _proposalInfo.start) {
93              errorCode = Errors.VOTING_NOT_STARTED;
94          } else if (now > _proposalInfo.end) {
95              errorCode = Errors.VOTING_HAS_ENDED;
96          }
97
98          if (errorCode > 0) {
99              IPadawan(msg.sender).rejectVote{value: 0, flag: 64,
                    bounce: true}(votes, errorCode);
100         } else {
101             IPadawan(msg.sender).confirmVote{value: 0, flag: 64,
                    bounce: true}(votes, _votePrice, _voteProvider);
102             if (choice) {
103                 _proposalInfo.votesFor += votes;
104             } else {
105                 _proposalInfo.votesAgainst += votes;
106             }
107         }
108
109         _wrapUp();
110     }
```

17.6.9 Function wrapUp

- TODO

```
73      function wrapUp() external override {
74          _wrapUp();
75          msg.sender.transfer(0, false, 64);
76      }
```

17.7 Internal Method Definitions

17.7.1 Function _buildPadawanState

- TODO

```
183     function _buildPadawanState(address owner) internal view
            override returns (TvmCell) {
184         return tvm.buildStateInit({
185             contr: Padawan,
186             varInit: {_deployer: _deployer, _owner: owner},
187             code: _codePadawan
188         });
189     }
```

17.7.2 Function _calculateVotes

- TODO

```
161     function _calculateVotes(
162         uint128 yes,
163         uint128 no
164     ) private view returns (bool) {
165         bool passed = false;
166         passed = _softMajority(yes, no);
167         return passed;
168     }
```

17.7.3 Function _changeState

- TODO

```
179     function _changeState(ProposalState state) private inline {
180         _proposalInfo.state = state;
181     }
```

17.7.4 Function _finalize

- TODO

```
112     function _finalize(bool passed) private {
113         _results = ProposalResults(
114             uint32(0),
115             passed,
116             _proposalInfo.votesFor,
117             _proposalInfo.votesAgainst,
118             _voteTotal,
119             _voteCountModel,
120             uint32(now)
121         );
122
123         ProposalState state = passed ? ProposalState.Passed :
                ProposalState.NotPassed;
124
125         _changeState(state);
126
127         IClient(address(_client)).onProposalPassed{value: 1 ton} (
                _proposalInfo);
128     }
```

17.7.5 Function _findInWhiteList

- TODO

```
224     function _findInWhiteList(address padawanOwner) view private
            returns (bool) {
225         for(uint32 index = 0; index < _whiteList.length; index++) {
226             if(_whiteList[index] == padawanOwner) {
227                 return true;
228             }
229         }
230         return false;
231     }
```

17.7.6 Function _getGroupMembers

- TODO

```
233     function _getGroupMembers(address group) view private {
234         IGroup(group).getMembers();
235     }
```

17.7.7 Function _softMajority

- TODO

```
170     function _softMajority(
171         uint128 yes,
172         uint128 no
173     ) private view returns (bool) {
174         bool passed = false;
175         passed = yes >= 1 + (_voteTotal / 10) + (no * ((_voteTotal
                / 2) - (_voteTotal / 10))) / (_voteTotal / 2);
176         return passed;
177     }
```

17.7.8 Function _tryEarlyComplete

- TODO

```
130     function _tryEarlyComplete(
131         uint128 yes,
132         uint128 no
133     ) private view returns (bool, bool) {
134         (bool completed, bool passed) = (false, false);
135         if (yes * 2 > _voteTotal) {
136             completed = true;
137             passed = true;
138         } else if(no * 2 >= _voteTotal) {
139             completed = true;
140             passed = false;
```

```
141         }
142         return (completed, passed);
143     }
```

17.7.9 Function _wrapUp

- TODO

```
145     function _wrapUp() private {
146         (bool completed, bool passed) = (false, false);
147 
148         if (now > _proposalInfo.end) {
149             completed = true;
150             passed = _calculateVotes(_proposalInfo.votesFor,
                    _proposalInfo.votesAgainst);
151         } else {
152             (completed, passed) = _tryEarlyComplete(_proposalInfo.
                    votesFor, _proposalInfo.votesAgainst);
153         }
154 
155         if (completed) {
156             _changeState(ProposalState.Ended);
157             _finalize(passed);
158         }
159     }
```