

Contracts vulnerabilities

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Involved contracts and level of the bugs

The present document aims to point out some vulnerabilities in the [autonolas-registry](#) contracts.

Vulnerabilities

1. tokenURI function

Severity: Low

The following function is implemented in the GenericRegistry contract:

```
function tokenURI(uint256 unitId) public view virtual override
returns (string memory)
```

This function is defined by the [EIP-721 standard](#). The standard states that the function is supposed to throw if **unitId** is not a valid NFT. However, in our contract, the function does not revert if the **unitId** is out of bounds, but just returns the value of a string with the defined prefix and 64 zeros derived from a zero bytes32 value.

Therefore, we recommend checking the return value of this view function, and if the last 64 symbols are zero, consider it to be an invalid NFT. Also one might use the **exists()** function to preliminary check if the requested NFT Id exists.

2. create function

Severity: Low

The following function is implemented in the GnosisSafeMultisig contract:

```
function create(address[] memory owners, uint256 threshold, bytes
memory data) external returns (address multisig)
```

This function creates a Safe service multisig when the service is deployed. Since Autonolas protocol follows an optimistic design, none of the fields for the Safe multisig creation are restricted. This way, the service owner might pass the *payload* field as they feel fit for the purposes of the service multisig. That said, any possible malicious behavior can also be embedded in the *payload* value.

In the event of the intended malicious multisig creation, the Autonolas protocol is not affected, however, accounts interacting with the corresponding service might bear eventual consequences of such a setup.

We strongly recommend not abusing the *payload* field of the service multisig when deploying the service to perform any malicious actions.

3. update function (zero bonds)

Severity: Low

The following function is implemented in the ServiceRegistry and ServiceRegistryL2 contracts:

```
function update(address serviceOwner, bytes32 configHash, uint32[]
memory agentIds, uint32 threshold, uint256 serviceId) external
returns (bool success)
```

This function allows updating a service in a *pre-registration* state in a CRUD way. E.g. if there is a need to remove `agentIds[i]` from the canonical agents making up the service, then it is sufficient to call this function and update it in such a way that a corresponding slots field is set to zero, i.e., `agentParam[i].slots=0`, also adjusting the threshold.

When an agent slot is non-zero, and an operator can register an agent instance for that slot, it is necessary that the corresponding agent bond is non-zero. In the current implementation, there is no check for agent bonds to be different from zero if the corresponding agent slot is non-zero. This vulnerability would enable an operator to register an agent instance without the corresponding security bond. Hence, the operator would not be affected by any possible slashing condition if the total operator bond is equal to zero.

This vulnerability is addressed for the ServiceRegistry contract and ServiceRegistryL2 on Gnosis chain by adding the zero-value check on the service manager level. Specifically, [serviceManagerToken](#) serving as a new service manager contract handles the [check](#) before calling the original serviceRegistry's update() method. See <https://github.com/valory-xyz/autonolas-registries/blob/main/test/ServiceManagerToken.js#L297-L303> for a test proving that the issue is resolved.

In absence of redeploying a new manager for the ServiceRegistryL2 contract on Polygon, we recommend that service owners assign a zero-value to agent bonds only if the corresponding agent slot is zero.

4. update function (replacing agent Ids)

Severity: Low

The following function is implemented in the ServiceRegistry contract:

```
function update(address serviceOwner, bytes32 configHash, uint32[]  
memory agentIds, uint32 threshold, uint256 serviceId) external  
returns (bool success)
```

As described earlier, this function allows updating a service in a *pre-registration* state in a CRUD way. However, considering that there is no possible direct damage to the protocol and to save on transaction gas costs, the function is implemented via an optimistic approach.

Specifically, the service owner might not specify that some of the *agent Ids* of the previous setup must be taken out of the system (by setting corresponding *slots* variable to zero). This means that operators are able to register agent instances specifying non-declared service agent Ids (as those were deliberately left in the corresponding map from the previous setup). This might lead to deploying the service on *agent Ids* from the previous setup, declaring that they actually run on current ones (as retrieved via the *getService()* view function).

We strongly recommend not abusing the *update()* function in order to deploy the service to perform any malicious actions by using undeclared *agent ids*, since this behavior is easily spotted off-chain.

5. `drain` function

Severity: Informative

The following function is implemented in the `ServiceRegistryTokenUtility` contract:

```
function drain(address token) external returns (uint256 amount)
```

The primary purpose of this function is to allow the removal of slashed tokens, other than chain-native tokens, from the contract.

By design, in the current setup of the Treasury contract, there is currently no mechanism in place to facilitate the removal of tokens other than ETH that have not been added to the Treasury through the `treasury depositTokenForOLAS()` method. Therefore, we strongly advise against assigning the drainer role to the Treasury contract for `ServiceRegistryTokenUtility` contract deployed on Ethereum.