Node: Metered-Notary

Erstellung von Belegen für den Strombezug basierend auf Zählerstandsgängen (Abfloge von Zählerständen eines Stromzählers).



Im Gegensatz zum Node "Event-Notary", werden beim Metered-Notary die Zählerstände von Ablesungen reglmäßig (zum Beispiel stündlich) in Wattstunden als Eingabenachricht erwartet. Das Ergebnis ist ein digital signierter Beleg, des Zertifizierungsdienstes, welcher in der Ausgabenachricht bereitgestellt wird. Zusätzlich wird eine Kopie des Beleges in die GHG Wallet gespeichert.

Beispiel Flow

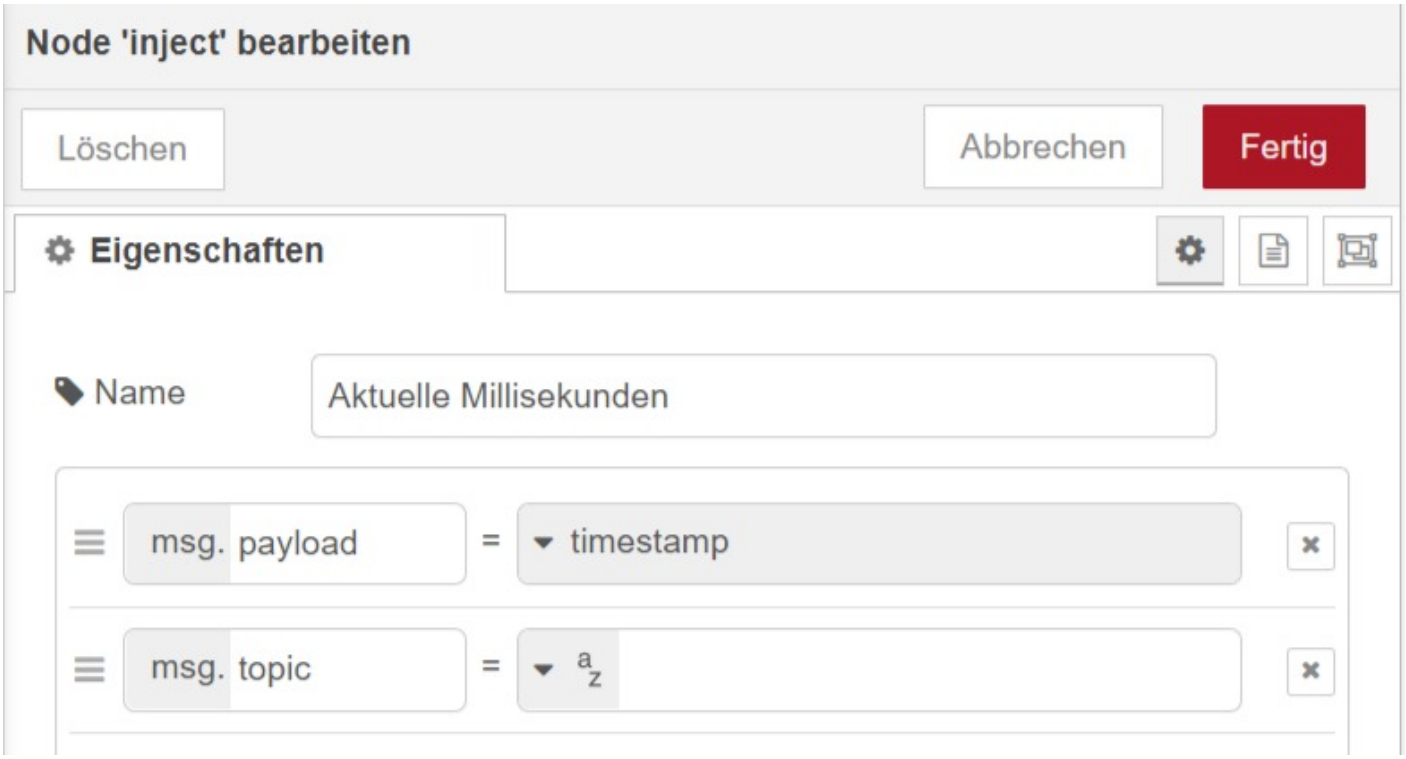
Download: simple_metered-notary.flow.json.json



Dem Metered-Notar Node wird als `msg. payload` die aktuellen Millisekunden übergeben, durch wiederholten Inject (Aufruf) entsteht so ein künstlicher Zählerstandsgang in Wattstunden (Wh). Durch die Differenz von zwei Zählerständen wird eine bezogene Strommenge ermittelt. Der Node sendet in einem ersten Schritt diese Daten an den Zertifizierungsdienst. Optional kann in der Konfiguration des Nodes eine Postleitzahl (Postal Code) angegeben werden, um dem Zertifizierungsdienst einen Hinweis über den Ort des Strombezuges mitzugeben. In einem zweiten Schritt erhält der Node ein Intermediate (=vorläufiger Beleg); überprüft das Intermediate; unterschreibt es und sendet es zum Zertifizierungsdienst. Die Rückantwort des Zertifizierungsdienst wird auf der Ausgabe als `msg. payload` zurückgegeben.

Eine detaillierte Beschreibung der Belegerstellung kann der TyDIDs Blockchain basierte Nachweisführung der THG-Emission und Minderung entnommen werden. Der Node Event-Notary implementiert diesen Prozess.

Eingabe (`msg. payload`)



Ausgabe


```
{
   "hash":{

"signature":"0x85f7460870ca348caf60a94a766521c697b60b5c0a80da10a96b9fe6129903056b62aa5b940788523357974a3adc5e50abf2b690d03c12fe26a517dd7924c3681c",
      "payload":"0xd90d0978039c34f955e0813af6c3f853ab43a891e508a3517a1c7c3929531be6"
   },
   "owner":{

"signature":"0xd73098704a6c8dfed4e6c2977f4b70f2591314fcee1ecbc733466a06788e8e84050a5f03c9fbe11be5b655219d5fcaa0692aead9e6e6d2d4bbb492c302b0e25a1b",
      "payload":{
         "owner":"0x48a2F735c6BC140C15109f5a8AFF8010715D9ddb",
         "issuer":"0xE7Fe0626D7B8e3F2e5ECD146F9b11daac1DBE447",
         "hash":"0xd90d0978039c34f955e0813af6c3f853ab43a891e508a3517a1c7c3929531be6"
      }
   },
   "context":{

"signature":"0xafdb01935aae5a2da5af49db2f723c1649dc8ce92913cc8521a5b587df9e8ba24a9cdd3f54514b1
```

```
868b15580d0ed21d9530cca623c532c874d4addfdd5934be51c",
      "payload":""
   },
   "did":{

"signature":"0xa9becd0fc1c99a0b03360f60705c831bc305c1487687aff9925116be71072f386e0c9e89855e133
6534081b6d5e74d6970d4a70836737968944ba9d2dea43dae1c",
      "payload":{

"url":"did:ethr:6226:0x3bFCf4Fe3b7D2E2fd079b5Dd546Aa30300D8fBE1:0xf21548440474afb51053CEEb3101
1d9E4a168D2D",
         "registry":"0x3bFCf4Fe3b7D2E2fd079b5Dd546Aa30300D8fBE1",
         "uid":"0xf21548440474afb51053CEEb31011d9E4a168D2D",
         "schema":"did",
         "method":"ethr:6226",
         "ghgtoken":{
            "address":"0x36AbF05ac533D9Bb2024A2fb00c9e3F52e4F6a50",
            "certificates":"0x65297AFaf11eeAd5258A46e969c2341708e9CC59",
            "savings":"0xc475EcB54601C676Ad008A7857A385a52c445244",
            "emissions":"0xd37B668Ad0417EcD22472ca555a431e84afB40BB"
         },
         "nft":{

"signature":"0x92923d135c6e4bc15bf8d20cd985f990f98fae8ac5ee3b3fc13785c75667b48239c5f888e9fa9cc
8f30d775c2f2da97da36d725a77ed81eabdf919657d6bdfbb1c",
            "payload":{
               "address":"0x65297AFaf11eeAd5258A46e969c2341708e9CC59",
               "tx":{
                  "nonce":2199,
                  "gasPrice":{
                     "type":"BigNumber",
                     "hex":"0x03e8"
                  },
                  "gasLimit":{
                     "type":"BigNumber",
                     "hex":"0x039a6c"
                  },
                  "to":"0x36AbF05ac533D9Bb2024A2fb00c9e3F52e4F6a50",
                  "value":{
                     "type":"BigNumber",
```

```
                    "hex":"0x00"
                },

"data":"0xa578e29c0000000000000000000000048a2f735c6bc140c15109f5a8aff8010715d9ddb000000000000
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0000000000000000000a0000000000000000000000000000000000000000000000000000000000010d00000000
0000000000000000000000000000000000000000000000013a0000000000000000000000000000000000000000
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03030443866424531 3a307866323135343834343034373461666235313035334345456233313031316439453461313638443244000000000000000000000000",
                "chainId":6226,
                "v":12488,
                "r":"0x35722641759b62ec2879dd41db2736e2c833fa1ab771ce7c57ead9238c1f8e03",
                "s":"0x15041ad76a387bd30fb3206551ddbbbf6310a311215bf2b1d04d14b912c0099b",
                "from":"0xE7Fe0626D7B8e3F2e5ECD146F9b11daac1DBE447",
                "hash":"0xb48af4752575241931521fabce913ee2f38814b79037af3bbf2ce6bd4e658736",
                "type":null,
                "confirmations":0
            },
            "receipt":{
                "to":"0x36AbF05ac533D9Bb2024A2fb00c9e3F52e4F6a50",
                "from":"0xE7Fe0626D7B8e3F2e5ECD146F9b11daac1DBE447",
                "contractAddress":null,
                "transactionIndex":0,
                "gasUsed":{
                    "type":"BigNumber",
                    "hex":"0x038340"
                },

"logsBloom":"0x00000000000080000000000000000000000020000000000000000000000000000000000000000000000000000000000000200800000000000010004000000000000000000000000800800000000000000000000000000000020000000080002400000200000000000000000080000000001000000000000100000000000000000000000000000000000000000000000000100020000000000000000000000000000000000000000000000000000000000
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                    {
                       "transactionIndex": 0,
                       "blockNumber": 648343,

"transactionHash": "0xb48af4752575241931521fabce913ee2f38814b79037af3bbf2ce6bd4e658736",
                       "address": "0x65297AFaf11eeAd5258A46e969c2341708e9CC59",
                       "topics":[

"0xddf252ad1be2c89b69c2b068fc378daa952ba7f163c4a11628f55a4df523b3ef",

"0x0000000000000000000000000000000000000000000000000000000000000000",

"0x000000000000000000000048a2f735c6bc140c15109f5a8aff8010715d9ddb",

"0x0000000000000000000000000000000000000000000000000000000000000457"
                       ],
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                       "logIndex": 0,

"blockHash": "0x33ddbecb4fe87e13e1b9556aaf92afee7f45b6fa36ab30c5c33b0b7098ba8558"
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                       "blockNumber": 648343,

"transactionHash": "0xb48af4752575241931521fabce913ee2f38814b79037af3bbf2ce6bd4e658736",
                       "address": "0xc475EcB54601C676Ad008A7857A385a52c445244",
                       "topics":[

"0xddf252ad1be2c89b69c2b068fc378daa952ba7f163c4a11628f55a4df523b3ef",

"0x0000000000000000000000000000000000000000000000000000000000000000",

"0x000000000000000000000000f21548440474afb51053ceeb31011d9e4a168d2d"
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"data": "0x000000000000000000000000000000000000000000000000000000000000013a",
                       "logIndex": 1,

"blockHash": "0x33ddbecb4fe87e13e1b9556aaf92afee7f45b6fa36ab30c5c33b0b7098ba8558"
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                    },
                    {
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"0x0000000000000000000000000000000000000000000000000000000000000000",

"0x000000000000000000000000f21548440474afb51053ceeb31011d9e4a168d2d"
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"data": "0x000000000000000000000000000000000000000000000000000000000000010d",
                       "logIndex": 2,

"blockHash": "0x33ddbecb4fe87e13e1b9556aaf92afee7f45b6fa36ab30c5c33b0b7098ba8558"
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                 "confirmations": 1,
                 "cumulativeGasUsed": {
                    "type": "BigNumber",
                    "hex": "0x038340"
                 },
                 "effectiveGasPrice": {
                    "type": "BigNumber",
                    "hex": "0x03e8"
                 },
                 "status": 1,
                 "type": 0,
                 "byzantium": true
              },
              "tokenId": "0x0000000000000000000000000000000000000000000000000000000000000457"
           }
        },
        "hash": "0xd90d0978039c34f955e0813af6c3f853ab43a891e508a3517a1c7c3929531be6"
```

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      }
   },
   "metering":{

"signature":"0xff554124da0b612bf4826f9fff3472b5e8636fb3f35cbdac20e2989b0fcbc6ba5012bcfb20f7e91b21c9135ce328aa45ffb189106197151621ceab90e8b77bb81b",
      "payload":{
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         "payload":"electricity consumption from public grid",
         "$schema":"https://schema.corrently.io/tydids/type"
      },
      "context":{

"signature":"0xafdb01935aae5a2da5af49db2f723c1649dc8ce92913cc8521a5b587df9e8ba24a9cdd3f54514b1868b15580d0ed21d9530cca623c532c874d4addfdd5934be51c",
         "payload":"",
         "$schema":"https://schema.corrently.io/tydids/context"
      },
      "location":{

"signature":"0xdb8491a4dc3a9e2d90821f5de30781c744e568386ba0732a7fec6d2c75e6f308216c2c30b82b3a6301c06a1b7eb780c7447bf80152febef0ab361f6975428db11c",
         "payload":{
            "zip":"00000",
            "city":"Landesweit (national)",
            "country":"Germany",
            "meloid":"DETESTSD13371337133713371337133713371337",
            "hash":"0xd90d0978039c34f955e0813af6c3f853ab43a891e508a3517a1c7c3929531be6"
         },
         "$schema":"https://schema.corrently.io/tydids/location"
      },
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         },
         "$schema":"https://schema.corrently.io/tydids/metering"
      },
      "consumption":{

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         "payload":{
            "unit":"wh",
            "actual":1337,
            "time":1673220421200,
            "hash":"0xd90d0978039c34f955e0813af6c3f853ab43a891e508a3517a1c7c3929531be6"
         },
         "$schema":"https://schema.corrently.io/tydids/consumption"
      },
      "ghg":{

"signature":"0x7b7636b91814e44a859eeac0d2a891d5d007d5930ee01f416607ce5da39fd925248d2b24649ad22cc6a2d496023b1fc04e06198fa901fa200696fa7664333b911c",
         "payload":{
            "factors":{
               "unit":"g co2eq per wh",
               "actual":{
                  "grid":0.201,
                  "eco":0.201
               },
               "base":{
                  "grid":0.436
               }
            },
            "base":{
               "unit":"g co2eq",
               "grid":583
            },
            "actual":{
               "unit":"g co2eq",
```

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               "grid": 269,
               "eco": 269
            },
            "saving": {
               "unit":"g co2eq",
               "grid": 314
            },
            "scope": 2,
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         },
         "$schema":"https: //schema. corrently. io/tydids/ghg"
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      "did": {

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            "registry":"0x3bFCf4Fe3b7D2E2fd079b5Dd546Aa30300D8fBE1",
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            "method":"ethr: 6226",
            "ghgtoken": {
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               "certificates":"0x65297AFaf11eeAd5258A46e969c2341708e9CC59",
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               "emissions":"0xd37B668Ad0417EcD22472ca555a431e84afB40BB"
            },
            "nft": {

"signature":"0x92923d135c6e4bc15bf8d20cd985f990f98fae8ac5ee3b3fc13785c75667b48239c5f888e9fa9cc
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               "payload": {
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                  "tx": {
                     "nonce": 2199,
                     "gasPrice": {
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                        "hex":"0x03e8"
                     },
                     "gasLimit":{
                        "type":"BigNumber",
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                     "value":{
                        "type":"BigNumber",
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                     "v":12488,
                     "r":"0x35722641759b62ec2879dd41db2736e2c833fa1ab771ce7c57ead9238c1f8e03",
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"hash":"0xb48af4752575241931521fabce913ee2f38814b79037af3bbf2ce6bd4e658736",
                     "type":null,
                     "confirmations":0
                  },
                  "receipt":{
                     "to":"0x36AbF05ac533D9Bb2024A2fb00c9e3F52e4F6a50",
                     "from":"0xE7Fe0626D7B8e3F2e5ECD146F9b11daac1DBE447",
                     "contractAddress":null,
                     "transactionIndex":0,
                     "gasUsed":{
                        "type":"BigNumber",
                        "hex":"0x038340"
                     },

"logsBloom":"0x00000000000080000000000000000000000020000000000000000000000000000000000000000000
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                          "transactionIndex":0,
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                          "address":"0x65297AFaf11eeAd5258A46e969c2341708e9CC59",
                          "topics":[

"0xddf252ad1be2c89b69c2b068fc378daa952ba7f163c4a11628f55a4df523b3ef",

"0x0000000000000000000000000000000000000000000000000000000000000000",

"0x000000000000000000000048a2f735c6bc140c15109f5a8aff8010715d9ddb",

"0x0000000000000000000000000000000000000000000000000000000000000457"
                          ],
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                          "logIndex":0,

"blockHash":"0x33ddbecb4fe87e13e1b9556aaf92afee7f45b6fa36ab30c5c33b0b7098ba8558"
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                          "topics":[

"0xddf252ad1be2c89b69c2b068fc378daa952ba7f163c4a11628f55a4df523b3ef",
```

```
"0x0000000000000000000000000000000000000000000000000000000000000000",

"0x000000000000000000000000f21548440474afb51053ceeb31011d9e4a168d2d"
                           ],

"data":"0x000000000000000000000000000000000000000000000000000000000000013a",
                           "logIndex":1,

"blockHash":"0x33ddbecb4fe87e13e1b9556aaf92afee7f45b6fa36ab30c5c33b0b7098ba8558"
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                           "transactionIndex":0,
                           "blockNumber":648343,

"transactionHash":"0xb48af4752575241931521fabce913ee2f38814b79037af3bbf2ce6bd4e658736",
                           "address":"0xd37B668Ad0417EcD22472ca555a431e84afB40BB",
                           "topics":[

"0xddf252ad1be2c89b69c2b068fc378daa952ba7f163c4a11628f55a4df523b3ef",

"0x0000000000000000000000000000000000000000000000000000000000000000",

"0x000000000000000000000000f21548440474afb51053ceeb31011d9e4a168d2d"
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"data":"0x000000000000000000000000000000000000000000000000000000000000010d",
                           "logIndex":2,

"blockHash":"0x33ddbecb4fe87e13e1b9556aaf92afee7f45b6fa36ab30c5c33b0b7098ba8558"
                        }
                     ],
                     "blockNumber":648343,
                     "confirmations":1,
                     "cumulativeGasUsed":{
                        "type":"BigNumber",
                        "hex":"0x038340"
                     },
                     "effectiveGasPrice":{
                        "type":"BigNumber",
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```
                        "hex":"0x03e8"
                     },
                     "status":1,
                     "type":0,
                     "byzantium":true
                  },

"tokenId":"0x0000000000000000000000000000000000000000000000000000000000000457"
               }
            },
            "hash":"0xd90d0978039c34f955e0813af6c3f853ab43a891e508a3517a1c7c3929531be6"
         },
         "$schema":"https://schema.currently.io/tydids/did"
      },
      "_all":{

"signature":"0x8999c3c3c95f8d010691499f336243cc076af36385ed72af331099363bd6717438b845c8db6c9cb
f5940490e884dbba8af602c9b46be86c12af4aee1d25e5a1e1b",
         "payload":{
            "type":"electricity consumption from public grid",
            "context":"",
            "location":{
               "zip":"00000",
               "city":"Landesweit (national)",
               "country":"Germany",
               "meloid":"DETESTSD13371337133713371337133713371337",
               "hash":"0xd90d0978039c34f955e0813af6c3f853ab43a891e508a3517a1c7c3929531be6"
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            "metering":{
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            },
            "consumption":{
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               "actual":1337,
               "time":1673220421200,
               "hash":"0xd90d0978039c34f955e0813af6c3f853ab43a891e508a3517a1c7c3929531be6"
            },
            "ghg":{
               "factors":{
                  "unit":"g co2eq per wh",
```

```
                  "actual":{
                     "grid":0.201,
                     "eco":0.201
                  },
                  "base":{
                     "grid":0.436
                  }
               },
               "base":{
                  "unit":"g co2eq",
                  "grid":583
               },
               "actual":{
                  "unit":"g co2eq",
                  "grid":269,
                  "eco":269
               },
               "saving":{
                  "unit":"g co2eq",
                  "grid":314
               },
               "scope":2,
               "hash":"0xd90d0978039c34f955e0813af6c3f853ab43a891e508a3517a1c7c3929531be6"
            },
            "_iat":1673220421256,
            "_iss":"0xE7Fe0626D7B8e3F2e5ECD146F9b11daac1DBE447",
            "_jti":"0xf21548440474afb51053CEEb31011d9E4a168D2D",
            "did":{

"url":"did:ethr:6226:0x3bFCf4Fe3b7D2E2fd079b5Dd546Aa30300D8fBE1:0xf21548440474afb51053CEEb31011d9E4a168D2D",
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               "schema":"did",
               "method":"ethr:6226",
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"0x0000000000000000000000000000000000000000000000000000000000000000",

"0x000000000000000000000048a2f735c6bc140c15109f5a8aff8010715d9ddb",

"0x0000000000000000000000000000000000000000000000000000000000000457"
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                           },
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                           "type": 0,
                           "byzantium": true
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"tokenId":"0x0000000000000000000000000000000000000000000000000000000000000457"
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               }
            },
            "$schema":"https: //schema. currently. io/tydids/_all"
         }
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}
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Quellcode der Implementierung

Revision #3
Created 8 January 2023 23:56:15 by Thorsten Zoerner
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