Interface description IoT
GT24S

Index	Changelog	Date
1.0	Initial version	03.05.2018
1.1	sample data is now consistent, new user endpoint added	04.06.2018
1.2	Change /operation query body to URL parameters	03.09.2018
1.3	System Node added	05.09.2018

1. Introduction

This document describes the basic functionality of the Tool24 software interface, which is used to query article and supplier data, inventories and user data, as well as to generate reservations (in the form of user-specific shopping carts) and to query booking data.

2. Abbreviations and definitions

REST…Representational State Transfer

IoT…Internet of Things

API…Advanced Programming Interface

JSON… JavaScript Object Notation

3. General functioning

The architecture of the Tool24 software is based on a client-server structure. The Tool24 Server runs on the computer installed in the cabinet. This server, installed as a service, can be addressed by external applications via a REST interface (Representational State Transfer). Authentication is handled by Basic Auth. The interface must be licensed via an additional license package (IoT-Pro).
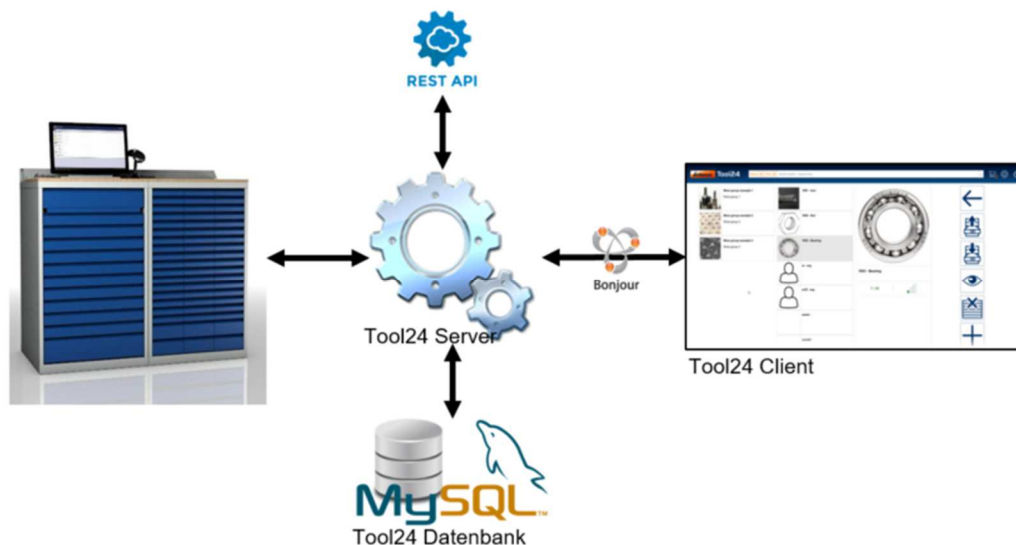

Abbildung 1: Softwarearchitektur

4. REST-interface to Tool24

Basic specifications

The specification is elaborated using instruction sets from the specification below.

The gateway for the REST interface is localhost (127.0.0.1), encryption of the communication is optional (SSL). The port witch the communication takes place is configurable. Response is always in JSON, all JSON standard values are supported (string, integer, boolean value, JSON array, JSON object). The return types are always identical for each parameter.

The web service can generally be accessed via five endpoints (for a detailed definition, see below):

/ - API Description

/system – General information about the current system

/article – returns information about the articles in the database of the requested system

/user – Returns information about the users in the database of the requested system.

/stock – Returns information about the available stocks in the system.

/reservation – Returns information about the reservations in the database of the requested system.

/operation – Provides information about the transactions in the database.

5. endpoints

5.1. /

URL	/
HTTP Method	GET
Parameters	-
Description	Returns API Information
Request Example	https://127.0.0.1:12121/
Request Headers	-
Request Body	-
Response Code (OK)	200
Response Body	Static API Information
Response Code (Error)	400: Malformed request

5.2. /system

URL	/system
HTTP Method	GET
Parameters	-
Description	Returns system information
Request Example	https://127.0.0.1:12121/
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node

Response Body	{
	  "location": "Location Identifier",
	  "name": "Systemname",
	  "version": "1.1.0.10"
	}

Response Code (Error)	400: Malformed request

5.3. /article-Request

URL	/article
HTTP Method	GET
Parameters	-
Description	Returns all article-data of a system
Request Example	https://127.0.0.1:12121/article
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node
Response Body	(see below)

```json
{
 "articles":
 [
  {
  "idArticle": 1,
  "articleNumber": "TA24451",
  "isActive": true,
  "label": "Bohrer Ø10",
  "barcode": "5466616516654",
  "description": "langer Bohrer",
  "detailedDescription": "sehr langer Bohrer VHM",
  "quantityIncrement": 1,
  "quantityUnit": "PCE",
  "suppliers": [
   {
   "supplierNumber": "A900",
   "supplierArticleNumber": "12345",
   "name": "MAPAL",
   "isActive": false,
   "obeyPackingUnit": true,
   "orderSingleArticle": true,
   "price": 12.18
   },
   {
   "supplierNumber": "A800",
    "supplierArticleNumber": "54321",
   "name": "Hoffmann",
   "isActive": true,
   "obeyPackingUnit": true,
   "orderSingleArticle": true,
   "price": 10.09
   }
  ],
  "parameters": [
   {
```

```
      "name": "Length",
      "value": 123.456
      },
      {
      "name": "ToolType",
      "value": 1
      }
      ]
      },
      {
      "idArticle": 12,
      "articleNumber": "TA24452",
      "isActive": true,
      "label": "Bohrer Ø12",
      "barcode": "546661633416654",
      "description": "kurzer Bohrer",
      "detailedDescription": "sehr kurzer Bohrer VHM",
      "quantityIncrement": 1,
      "quantityUnit": "PCE",
      "suppliers": [
      {
      "supplierNumber": "A900",
      "supplierArticleNumber": "4322345g",
      "name": "MAPAL",
      "isActive": false,
      "obeyPackingUnit": true,
      "orderSingleArticle": true,
      "price": 1.18
      },
      {
      "supplierNumber": "A800",
      "supplierArticleNumber": "asddas2",
      "name": "Hoffmann",
      "isActive": true,
      "obeyPackingUnit": true,
      "orderSingleArticle": true,
      "price": 1.09
      }
      ],
      "parameters": [
      {
      "name": "Length",
      "value": 12.456
      },
      {
      "name": "ToolType",
      "value": 1
      }
```

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	]
	}
	]
	}
Response Code (Error)	400: Malformed request
	404: no article data available

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URL	/article
HTTP Method	GET
Parameters	id
Description	Returns article-data of a dedicated Database-ID
Request Example	https://127.0.0.1:12121/article?id=1
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node
Response Body	

```json
{
"idArticle": 1,
"articleNumber": "TA24451",
"isActive": true,
"label": "Bohrer Ø10",
"barcode": "5466616516654",
"description": "langer Bohrer",
"detailedDescription": "sehr langer Bohrer VHM",
"quantityIncrement": 1,
"quantityUnit": "PCE",
"suppliers": [
{
"supplierNumber": "A900",
"supplierArticleNumber": "12345",
"name": "MAPAL",
"isActive": false,
"obeyPackingUnit": true,
"orderSingleArticle": true,
"price": 12.18
},
{
"supplierNumber": "A800",
 "supplierArticleNumber": "54321",
"name": "Hoffmann",
"isActive": true,
"obeyPackingUnit": true,
"orderSingleArticle": true,
"price": 10.09
}
],
"parameters": [
{
"name": "Length",
"value": 123.456
},
{
```

| | ```json
    "name": "ToolType",
    "value": 1
    }
  ]
}
``` |
| **Response Code (Error)** | 400: Malformed request
404: Unknown database-id |

URL	/article
HTTP Method	GET
Parameters	number
Description	Returns article-data of a dedicated customer article number
Request Example	https://127.0.0.1:12121/article?number=TA244451
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node
| **Response Body** | ```json
{
  "idArticle": 1,
  "articleNumber": "TA24451",
  "isActive": true,
  "label": "Bohrer Ø10",
  "barcode": "5466616516654",
  "description": "langer Bohrer",
  "detailedDescription": "sehr langer Bohrer VHM",
  "quantityIncrement": 1,
  "quantityUnit": "PCE",
  "suppliers": [
    {
    "supplierNumber": "A900",
    "supplierArticleNumber": "12345",
    "name": "MAPAL",
    "isActive": false,
    "obeyPackingUnit": true,
    "orderSingleArticle": true,
    "price": 12.18
    },
    {
    "supplierNumber": "A800",
    "supplierArticleNumber": "33252345",
    "name": "Hoffmann",
    "isActive": true,
    "obeyPackingUnit": true,
    "orderSingleArticle": true,
    "price": 10.09
    }
``` |

```
        ],
        "parameters": [
        {
        "name": "Length",
        "value": 123.456
        },
        {
        "name": "ToolType",
        "value": 1
        }
        ]
        }
```

Response Code (Error)	400: Malformed request 404: Unknown article number

5.4. /user-Request

URL	/user
HTTP Method	GET
Parameters	-
Description	Returns all user-data of a system (except for password information)
Request Example	https://127.0.0.1:12121/user
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node
Response Body	``` { "users": [{ "idUser": 1, "identifier": "admin", "isActive": true, "givenName": "Test", "lastName": "Admin", "eMailAddress": "test@admin.com", "costCenter": "A1000" }, { "idUser": 3, "identifier": "user", "isActive": true, "givenName": "Test", "lastName": "user", "eMailAddress": "test@user.com", "costCenter": "A2000" }] } ```
Response Code (Error)	400: Malformed request 404: no userdata available

URL	/user
HTTP Method	GET
Parameters	id
Description	Returns user-data of a system for a dedicated user database-id (except for password information)
Request Example	https://127.0.0.1:12121/user?id=1
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node

Response Body	{
	"idUser": 1,
	"identifier": "admin",
	"isActive": true,
	"givenName": "Test",
	"lastName": "Admin",
	"eMailAddress": "test@admin.com",
	"costCenter": "A1000"
	}

Response Code (Error)	400: Malformed request 404: id unknown

URL	/user
HTTP Method	GET
Parameters	identifier
Description	Returns user-data of a system for a dedicated login-name (except for password information)
Request Example	https://127.0.0.1:12121/user?identifier =admin
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node

Response Body	{
	"idUser": 1,
	"identifier": "admin",
	"isActive": true,
	"givenName": "Test",
	"lastName": "Admin",
	"eMailAddress": "test@admin.com",
	"costCenter": "A1000"
	}

Response Code (Error)	400: Malformed request 404: login-name unknown

URL	/user
HTTP Method	GET
Parameters	rfid
Description	Returns user-data of a system for a dedicated rfid-login (except for password information)
Request Example	https://127.0.0.1:12121/user? rfid =132488941
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node

Response Body	{
	"idUser": 1,
	"identifier": "admin",
	"isActive": true,
	"givenName": "Test",
	"lastName": "Admin",
	"eMailAddress": "test@admin.com",
	"costCenter": "A1000"
	}

Response Code (Error)	400: Malformed request 404: login-name unknown

5.5.   /stock-Request

URL	/stock
HTTP Method	GET
Parameters	-
Description	Returns stock information for all articles
Request Example	https://127.0.0.1:12121/stock
Request Headers	-
Request Body	-
Response Code (OK)	200

Response Body	{
	  "stock":
	   [
	    {
	    "idArticle": 1,
	    "articleNumber": "TA24451",
	    "availableQuantity": 15,
	    "reservedQuantity": 5,
	    "currentQuantity": 20,
	    "maxQuantity": 50,
	    "reorderQuantity": 50,
	    "criticalQuantity": 5,
	    "warningQuantity": 20
	    },
	    {
	    "idArticle": 12,
	    "articleNumber": "TA24452",
	    "availableQuantity": 15,
	    "reservedQuantity": 5,
	    "currentQuantity": 20,
	    "maxQuantity": 50,
	    "reorderQuantity": 50,
	    "criticalQuantity": 5,
	    "warningQuantity": 20
	    }
	   ]
	}

Response Code (Error)	400: Malformed request

URL	/stock
HTTP Method	GET
Parameters	id
Description	Returns stock information for a dedicated database-article-id
Request Example	https://127.0.0.1:12121/stock?id=1
Request Headers	-
Request Body	-
Response Code (OK)	200

Response Body	{
	"idArticle": 1,
	"articleNumber": "TA24451",
	"availableQuantity": 15,
	"reservedQuantity": 5,
	"currentQuantity": 20,
	"maxQuantity": 50,
	"reorderQuantity": 50,
	"criticalQuantity": 5,
	"warningQuantity": 20
	}

Response Code (Error)	400: Malformed request 404: database-id unknown

URL	/stock
HTTP Method	GET
Parameters	number
Description	Returns stock information for a dedicated customer-article-number
Request Example	https://127.0.0.1:12121/stock?number=TA24451
Request Headers	-
Request Body	-
Response Code (OK)	200

Response Body	{
	"idArticle": 1,
	"articleNumber": "TA24451",
	"availableQuantity": 15,
	"reservedQuantity": 5,
	"currentQuantity": 20,
	"maxQuantity": 50,
	"reorderQuantity": 50,
	"criticalQuantity": 5,
	"warningQuantity": 20
	}

Response Code (Error)	400: Malformed request 404: number unknown

5.6.   / reservation-Request

URL	/reservation
HTTP Method	GET
Parameters	-
Description	Returns all reservation-data of a system
Request Example	https://127.0.0.1:12121/reservation
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node

Response Body	```json
	{
	 "reservations":
	 [
	  {
	  "idReservation": 30,
	  "uuid": "9940efdd-46f6-4406-a231-37cc4e2e589c",
	  "idArticle": 1,
	  "articleNumber": "TA24451",
	  "idUser": 3,
	  "datetime": "2012-06-14T23:34:30",
	  "actionType": 1,
	  "quantity": 5
	  },
	  {
	  "idReservation": 34,
	  "uuid": "7b9c115e-8a0b-43fd-9d75-9b4666518ab4",
	  "idArticle": 12,
	  "articleNumber": "TA24452",
	  "idUser": 1,
	  "datetime": "2012-06-18T23:34:30",
	  "actionType": 1,
	  "quantity":
	  }
	]
	}
	``

Response Code (Error)	400: Malformed request 404: no reservations available

URL	/reservation
HTTP Method	GET
Parameters	uuid
Description	Returns reservation-data of a system for a given uuid
Request Example	https://127.0.0.1:12121/reservation?uuid=9940efdd-46f6-4406-a231-37cc4e2e589c
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node

Response Body	{
	"idReservation": 30,
	"uuid": "9940efdd-46f6-4406-a231-37cc4e2e589c",
	"idArticle": 1,
	"articleNumber": "TA24451",
	"idUser": 3,
	"datetime": "2012-06-14T23:34:30",
	"actionType": 2,
	"quantity": 5
	}
	
	(actionType: 0=inValidOperation, 1=Open, 2=Store, 3=Withdraw, 4=Revert, 5=Close, 6=Inventory, 7=Header, 8=Abort, 9=Preview)

Response Code (Error)	400: Malformed request 404: uuid unknown

URL	/reservation
HTTP Method	POST
Parameters	-
Description	Inserts a reservation for a given article for a dedicated user and returns a uuid
Request Example	https://127.0.0.1:12121/reservation
Request Headers	Content-type: application/json

Request Body	{
	"articleNumber": "TA24451",
	"userIdentifier": "admin",
	"actionType": 3,
	"quantity": 5
	}
	(actionType: 0=inValidOperation, 1=Open, 2=Store, 3=Withdraw, 4=Revert, 5=Close, 6=Inventory, 7=Header, 8=Abort, 9=Preview) – only use red marked Enums!

Response Code (OK)	200 on correctly calling the node
Response Body	{

	"uuid":"9940efdd-46f6-4406-a231-37cc4e2e589c" }
Response Code (Error)	400: Malformed request 404: userIdentifier, articleNumber or actionType unknown, quantity > available quantity

URL	/reservation
HTTP Method	DELETE
Parameters	uuid
Description	Deletes a dedicated reservation
Request Example	https://127.0.0.1:12121/reservation?uuid=7b9c115e-8a0b-43fd-9d75-9b4666518ab4
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node

Response Body	{
	    "uuid": "7b9c115e-8a0b-43fd-9d75-9b4666518ab4"
	}

Response Code (Error)	400: Malformed request 404: reservation does not exist

5.7.   /operation-Request

URL	/operation
HTTP Method	GET
Parameters	timeStamp periodType
Description	Returns all operation-data of a system (bookings) for a dedicated timeframe (timestamp – period given by periodType)
Request Example	https://127.0.0.1:12121/operation?timeStamp=2018-02-01T23:55:00Z&periodType=4 (periodType: 0=one hour, 1=one day, 2=one week, 3=one month, 4=one year)
Request Headers	-
Request Body	-
Response Code (OK)	200 on correctly calling the node

Response Body	{
	 "operations":
	 [
	  {
	        "idOperation": 123,
	        "idRefOperation": 0,
	        "idLocation": 1,
	        "systemName": "Tool24",
	        "compartmentLabel": "101",
	        "drawerLabel": "103",
	        "dispenserLabel": "100012",
	        "idArticle": 1,
	        "articleNumber": "TA24451",
	        "articleLabel": "Bohrer Ø10",
	        "supplierNumber": "A800",
	        "supplierCustomerNumber": "A800",
	        "supplierName": "Hoffmann",
	        "supplierArticleNumber": "adfase",
	        "idUser": 1,
	        "userIdentifier": "admin",
	        "userName": "Test",
	        "dateTime": "2012-06-14T23:34:30",
	        "actionType": 1,
	        "actionName": "Withdraw",
	        "quantity": 5,
	        "cost": 50.45,
	        "toolState": 1,
	        "toolStateText": "New",
	        "parameters": [{
	                    "name": "Kostenstelle_1",

	``
	                    "value" : "1000"
	            },
	
	            {
	
	                    "name": "Auftragsnummer",
	                    "value" : "4568132"
	            },
	            {
	
	                    "name": "ReservationUUID",
	                    "value" : "7b9c115e-8a0b-43fd-9d75-
	9b4666518ab4"
	            }]
	
	    },
	    {
	        ...
	    }
	  ]
	}
	``

Response Code (Error)	400: Malformed request 404: no reservations available