Industrial Data eXchange
IDX Project Team Proposal

2.1 Purpose
There is an opportunity to build a new digital industrial data exchange platform by PIDX members for PIDX members.

2.2 Scope
The initiative focuses on building an API-driven and cloud-based industrial data exchange platform to establish and share strategic data sources among the PIDX ecosystem of operators, suppliers, and IT companies.

2.3 Goal
The industrial data exchange platform will: 1) consolidate and share data across the entire ecosystem and empower members to derive their own insights and 2) effectively leverage PIDX’s existing and future standards.

2.3.1 Identify criteria for success of the deliverables / specification as deployed in industry.
   1) Cloud-based 2) API-driven 3) publishes PIDX standards 4) measured by size of data available in the data exchange 5) measured by number of API calls

2.3.2 Identify all of the stakeholders of which you are aware. Operators, Suppliers, and Marketplaces
   All

2.3.3 Identify the stakeholders who are willing to join the work effort. (See Sponsor & Participants)
   Chevron, BHGE, Microsoft, and others
IDX Project Team Proposal

2.4 Proposal

There is an opportunity to build a new digital industrial data exchange platform by PIDX members for PIDX members. The initiative focuses on building an API-driven and cloud-based industrial data exchange platform to establish and share strategic data sources among the PIDX ecosystem of operators, suppliers, and IT companies.

The industrial data exchange platform will: 1) consolidate and share data across the entire ecosystem and empower members to derive their own insights and 2) effectively leverage PIDX's existing and future standards. Some example use cases for this industrial data exchange platform include invoice management, virtual management of physical assets, logistics optimization, etc.

4.0 List benefits for all PIDX users

Wider adoption of PIDX standards; ease to consume Opportunity to build data ecosystem across companies for important challenges, e.g. carbon footprint, logistics operations, open manufacturing
5 Sponsor and Participants

PIDX member/company sponsoring development of these specifications/this project:

<table>
<thead>
<tr>
<th>Member</th>
<th>Company</th>
<th>E-Mail Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rachel Shaffer</td>
<td>Chevron</td>
<td><a href="mailto:rachel.shaffer@chevron.com">rachel.shaffer@chevron.com</a></td>
</tr>
<tr>
<td>Mandar Moghe</td>
<td>Schlumberger</td>
<td><a href="mailto:mmoghe@cameron.slb.com">mmoghe@cameron.slb.com</a></td>
</tr>
<tr>
<td>Trish Nguyen</td>
<td>BHGE</td>
<td><a href="mailto:trish.nguyen@bhge.com">trish.nguyen@bhge.com</a></td>
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Architecture Design - Start with Something Simple

Develop API Interfaces to various master data tables ALREADY managed by PIDX

Provide JSON Objects as results

Use existing PIDX Google Cloud Services and deploy an API Server
Architecture Design - Start with Something Simple

Develop API Interfaces to various master data tables ALREADY managed by PIDX

Provide JSON Objects as results

Use existing PIDX Google Cloud Services and deploy an API Server – api.pidx.org
## Data Sources – Product Codes

New code requests frequently

---

<table>
<thead>
<tr>
<th>Name</th>
<th>Data Modified</th>
<th>Kind</th>
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<tbody>
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<td>May 7, 2022 at 5:03 PM</td>
<td>Microsoft</td>
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<tr>
<td>PIDX Product Code_02-17-2022.xlsx</td>
<td>Mar 7, 2022 at 10:00 AM</td>
<td>Microsoft</td>
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<tr>
<td>PIDX Product Code_02-25-2022.xlsx</td>
<td>Jan 5, 2022 at 7:00 AM</td>
<td>Microsoft</td>
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Data Sources – Product Codes

New code requests frequently
# Data Sources – Company Codes

**Infrequent Changes**

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<tr>
<th>PIDX Company Code</th>
<th>Mailing Address</th>
<th>Mailing City</th>
<th>Mailing State</th>
<th>Mailing Zip</th>
<th>Mailing Phone</th>
<th>Contact</th>
<th>Current</th>
<th>Assigned</th>
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<td>333 SE 2nd Ave STE 2800</td>
<td>Miami</td>
<td>FL</td>
<td>33131</td>
<td>386.301.1178</td>
<td>Keith Hervey</td>
<td><a href="mailto:khervey@stomm.com">khervey@stomm.com</a></td>
<td>02/22/20</td>
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<tr>
<td>PIDX_Company_Codes_4_16_2020.xlx</td>
<td>440 Louisiana ST, STE 1818</td>
<td>Houston</td>
<td>TX</td>
<td>77002</td>
<td>281.455.3129</td>
<td>Balle Hulse</td>
<td><a href="mailto:balle.hulse@stomm.com">balle.hulse@stomm.com</a></td>
<td>03/23/20</td>
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<tr>
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</table>

To assign a new code or retire one that is obsolete, please contact companycodes@pidx.org.
## Data Sources – Terminal Codes

### Mostly Static Data

<table>
<thead>
<tr>
<th>Terminal Name</th>
<th>Terminal ID</th>
<th>Address</th>
<th>Terminal City/Town/Locality</th>
<th>Terminal Country/Province</th>
<th>Terminal Zip Code</th>
<th>Terminal Country</th>
<th>Terminal Geo Coordinates</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHELL</td>
<td>SHELL00011</td>
<td>Germany</td>
<td>Frankfurt</td>
<td>Germany</td>
<td>60326</td>
<td>Germany</td>
<td>50.0784, 8.6946</td>
</tr>
<tr>
<td>SHELL</td>
<td>SHELL00012</td>
<td>Germany</td>
<td>Hamburg</td>
<td>Germany</td>
<td>20354</td>
<td>Germany</td>
<td>53.5490, 10.0069</td>
</tr>
<tr>
<td>SHELL</td>
<td>SHELL00013</td>
<td>Germany</td>
<td>Munich</td>
<td>Germany</td>
<td>80337</td>
<td>Germany</td>
<td>48.1351, 11.5755</td>
</tr>
<tr>
<td>SHELL</td>
<td>SHELL00014</td>
<td>Germany</td>
<td>Berlin</td>
<td>Germany</td>
<td>10117</td>
<td>Germany</td>
<td>52.5200, 13.4173</td>
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<tr>
<td>SHELL</td>
<td>SHELL00015</td>
<td>Germany</td>
<td>Stuttgart</td>
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<td>48.8270, 9.6712</td>
</tr>
</tbody>
</table>

**Note:** The table above lists some of the static data sources for terminal codes, including the terminal name, terminal ID, address, and location information. The data is primarily from Germany.
Architecture Overview

api.pidx.org
Architecture Overview

http://api.pidx.org:8080/api/v1/resources/codes/all
Architecture Overview

API

FLASK

SQLITE

PYTHON

UBUNTU

api.pidx.org

```json
{
"result": [
{
"cetane_octane": ",",
"code": "A20",
"comments": "100/130 LOW LEAD",
"date_code_assigned": "31-Dec-92",
"description": "",
"oxygenate_percent": "",
"oxygenated_rbob_type": "N",
"product_definition": "AVIATION GASOLINE",
"requester": ""
},
{
"cetane_octane": "",
"code": "A21",
"comments": "AVIATION GASOLINE",
"date_code_assigned": "30-Apr-19",
"description": "AVIATION GASOLINE",
"oxygenate_percent": "",
"oxygenated_rbob_type": "",
"product_definition": "Unbranded Aviation Gasoline 100/LL",
"requester": "BRENT BOWDEN"
},
{
"cetane_octane": "",
"code": "A25",
"comments": "100/130 HIGH LEAD",
"date_code_assigned": "31-Dec-92",
"description": "",
"oxygenate_percent": "",
"oxygenated_rbob_type": "N",
"product_definition": "AVIATION GASOLINE",
"requester": ""
}
]
}```
Architecture Overview – Production Ready

API

http://api.pidx.org:8080/api/v1/resources/codes/all
PIDX Product Codes

API Interface to master data
Return JSON Object with all Master Data from API Web Call
http://api.pidx.org:8080/api/v1/resources/codes/all

API Searchable Interface to master data
Return JSON Object with subset of Master Data from API Web Call
Searchable Product Codes API Examples
http://api.pidx.org:8080/api/v1/resources/codes?code=B22
PIDX Product Codes

API Interface to master data
Searchable Product Codes API Examples
http://api.pidx.org:8080/api/v1/resources/codes?code=B22

```json
result:
  0:
    "result": [
      {
        "cetane_octane": "",
        "code": "B22",
        "comments_": "Ed80 80% ETHANOL/20% RBOB REG 85",
        "date_code_assigned": "10-May-11",
        "description": "ALTERNATIVE FUEL - Ed80",
        "oxygenate_percent": "80",
        "oxygenated_rbob_type": "A",
        "product_definition": "FUEL ETHANOL",
        "requester": "JEAN PICKETT"
      }
    ]
```
PIDX Product Codes

API Interface to master data
Searchable Product Codes API Examples
http://api.pidx.org:8080/api/v1/resources/codes?code=B22

```json
result:

0:

cetane_octane: ""
code: "B22"
comments_: "Ed80 80% ETHANOL/20% RBOB REG 85"
date_code_assigned: "10-May-11"
description: "ALTERNATIVE FUEL - Ed80"
oxygenate_percent: "80"
oxygenated_rbob_type: "A"
product_definition: "FUEL ETHANOL"
requester: "JEAN PICKETT"
```
http://api.pidx.org:8080/api/v1/resources/codes?code=B22
PIDX Product Codes

PIDX Google Cloud Services – API Server – api.pidx.org

API Interface to master data
  Product Codes
    http://api.pidx.org:8080/api/v1/resources/codes/all
  Searchable Product Codes
    http://api.pidx.org:8080/api/v1/resources/codes?code=B22
  Codes by Country
    http://api.pidx.org:8080/data
API Enablement with JSON Web Services

Python Code & Flask

```python
import flask
from flask import request, jsonify
from flask_cors import CORS
from flask import render_template
import sqlite3
import json

def dict_factory(cursor, row):
    d = {};
    for idx, col in enumerate(cursor.description):
        d[col[0]] = row[idx]
    return d

app = flask.Flask(__name__)
app.config['DEBUG'] = True
CORS(app)

def dict_factory(cursor, row):
    d = {};
    for idx, col in enumerate(cursor.description):
        d[col[0]] = row[idx]
    return d

@app.errorhandler(404)
def page_not_found(e):
    return '<h1>PIDX API Server - 404</h1>', 404

@app.route('/', methods=['GET'])
def api_home():
    message = 'PIDX Code Server'
    return render_template('index.html', message=message)

@app.route('/api/v1/resources/codes/all', methods=['GET'])
def api_code_data():
    conn = sqlite3.connect('prodcodes.db')
    conn.row_factory = dict_factory
    cur = conn.cursor()
    all_product_codes = cur.execute('SELECT * FROM prodcodes;').fetchall()
    conn.close()
    return jsonify([{'result': [dict(row) for row in all_product_codes]]})
```

Error Handler

Searchable JS Web Form

Get all PRODUCT codes
API Enablement with JSON Web Services

https://github.com/devpidx/pidx_codes_query
PIDX Product Codes

Web User Search Interface to master data
IDX Next Steps

Web Search Development
Downstream group to lead development of Web Search Interface

Convert Data Maintenance to Tables and Migrate Away from Excel Downloads
PIDX Office Tea to support maintenance of the data tables via current request interface
Change output and use API JSON Object Request/Response
Ability to call API to retrieve an XLS version of the table data

Automated Data Extracts for PIDX Members
Assist PIDX Members to implement true machine to machine updates for data

Push Notifications
Date based data “Give me all records changed since our last extract on Sunday”
Industrial Data eXchange