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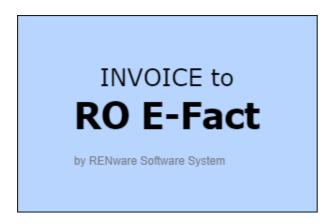
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I. INVOICEtoROefact



RENware Software Systems

1 INVOICEtoROefact

version 0.5.4.dev0

Facturi emise in Excel, problema rezolvata cu INVOICEtoROefact!

Emiteti si folositi in continuare facturi in Excel. Acest sistem va produce fisierul XML de care aveti nevoie pentru sistemul ANAF E-Factura

(https://www.anaf.ro/anaf/internet/ANAF/despre_anaf/strategii_anaf/proiecte_digitalizare/e.factura).

Si mai mult, daca aveti nevoie, puteti Integra aceste facturi si alte sisteme externe prin metode moderne, uzuale, curente, incetatenite de ani de zile si binecunoscute de specialistii din IT.

1.1 Componentele si facilitatile sistemului

Sistemul INVOICEtoROefact ofera urmatoarele componente:

- xl2roefact version 0.5.4.dev0 procesarea facturilor in mod linie de comanda
- web2roefact version n/a procesarea facturilor din interfara web
- xl2roefact python library version 0.5.4.dev0 procesarea facturilor prin cod / program (development propriu)
- invoice template version 0.1.20 model / sablon factura in Excel

Descrierea tuturor acestora poate fi accessata aici.

1.2 Date identificare

• p/n: 0000-0095

• code-name: api_to_roefact

- commercial name: INVOICEtoROefact
- site web (https://invoicetoroefact.renware.eu/)
- Git Hub repository (https://github.com/petre-renware/api_to_roefact)
- Git Hub releases (https://github.com/petre-renware/api_to_roefact/releases)
- copyright: RENware Software Systems
- author: Petre Iordanescu (petre.iordanescu@gmail.com)
- general system license

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2 Componentele sistemului

Cuprins:

- · Componentele sistemului
 - Componente
 - xl2roefact
 - xl2roefact Python library
 - web2roefact
 - invoice template
 - · Criterii de clasificare
 - Note

Sistemul consta din mai multe componente toate avind acelasi obiectiv central: **emiterea de facturi si procesarea facturilor emise existente deja**. Faptul ca sunt mai multe componente asigura *mai multe cai alternative* de a atinge obiectivul central, cai ce pot fi utilizate in paralel (concurent, in acelasi timp) in functie de "dotarea tehnica" a fiecaruia, de afinitatea fiecaruia la un "gen" de sisteme sau pur si simplu de preferinta de moment a fiecaruia.

2.1 Componente

Sistemul ofera urmatoarele componente:

- xl2roefact version 0.5.4.dev0 procesarea facturilor in mod linie de comanda
- xl2roefact Python library version 0.5.4.dev0 procesarea facturilor prin cod / program (development propriu)
- web2roefact version n/a procesarea facturilor din interfara web
- invoice template version 0.1.20 model / sablon factura in Excel

Facilitatile generale ale fiecareia din acestea sunt prezentate in continuare.

2.1.1 xl2roefact

Aplicatie linie de comanda pentru procesarea facturilor. Facilitati (vezi "Criterii de clasificare"):

- · Operare: CLI
- Introducere si import factura (INp):
 - XLSX

✓ JSON
✓ FORM
Export si salvare factura electronica (EXp);
✓ JSON
✓ XML
✓ EXCEL (pentru recipisa incarcare ROeF)
✓ PDF
✓ Ready to Run
✓ ROeF

Descriere detaliata aici

2.1.2 xl2roefact Python library

Pachet (biblioteca) public *Python* utilizabil pentru dezvoltare / extindere aplicatii proprii. Facilitati (*vezi "Criterii de clasificare"*):

- Operare: din cod software
- Introducere si import factura (INp):
 - XLSX
 - JSON
 - FORM
- Export si salvare factura electronica (EXp);
 - JSON
 - XML
 - EXCEL (pentru recipisa incarcare ROeF)
 - PDF
- Ready to Run
- ROeF

Descriere detaliata aici

2.1.3 web2roefact

Aplicatie web pentru procesarea facturilor. Facilitati (vezi "Criterii de clasificare"):

· Operare: WEB

• Introducere si import factura (INp): XLSX JSON FORM • Export si salvare factura electronica (EXp); JSON XML EXCEL (pentru recipisa incarcare ROeF) PDF Ready to Run ROeF 2.1.4 invoice template Sablon factura in format Office Excel. Facilitati (vezi "Criterii de clasificare"): • Operare: din aplicatie Office Excel • Introducere si import factura (INp): XLSX JSON FORM · Export si salvare factura electronica (EXp); JSON ✓ XML EXCEL PDF (din aplicatia Office Excel) Ready to Run ROeF Descriere detaliata aici

2.2 Criterii de clasificare

In scopul identificarii mai usoare a componentelor necesare acestea sunt clasificate dupa urmatoarele criterii:

• Operare interfata de operare al componentei:

- CLI linie de comanda (din consola tip "command prompt" sau terminal)
- WEB web din browser
- din cod software
- · din aplicatia locala Office Excel
- INp modul de introducere si import a facturii:
 - XLSX import dintr-un document Office Excel unde a fost deja introdusa anterior preluarii. Ca si instrument de introducere poate fi folosit oricare din cele ce permit salvarea / exportul in format XLSX (alte formate, in special cel anterior XLS nu sunt importabile ci trebuiesc "convertite" la formatul xlsx)
 - JSON import din format JSON
 - FORM factura se poate introduce manual direct in sistem, acesta punind la dispozitie un formular dedicat acestei operatii
- **EXp** formatul de exportare si salvare a facturii electronice¹:
 - JSON format folosit pentru interschimbarea, interfatarea datelor cu sisteme standard REST (de exemplu Oracle EBS)
 - XML format folosit pentru interschimbarea, interfatarea datelor cu sisteme standard SOAP ² (de exemplu RO eFact, SAP)
 - EXCEL format Office Excel xlsx
 - PDF format Adobe PDF tiparibil
- **Ready to Run** specifica faptul ca acea componenta poate fi folosita ca atare, fara o instalare prealabila ("ready to run") altfel aceasta trebuie instalata inainte de utilizare
- ROeF specifica faptul ca acea componenta permite incarcarea automata³ a facturii in sistemul ANAF SPV RO
 eFact

2.3 Note

- 1. Exportul facturilor in formatele EXCEL si respectiv PDF se face utilizind formatul vizual al documentului din componenta invoice template ←
- 3. incarcarea automata a facturii in sistemul ANAF RO eFact este conditionata de configurarea respectivei componente cu credentialele necesare autentificarii in acest sistem (altfel acesta informatie va fi ceruta utilizatorui pentru introducere manuala) ←

II. xl2roefact

RENware Software Systems

3 xl2roefact

version 0.5.4.dev0

Legaturi externe utile:

- **Web Site** (https://invoicetoroefact.renware.eu/) . (Pentru acces corect la toate referintele din acest document vizitati site-ul dedicat acestui sistem.)
- Pachet PyPi (https://pypi.org/project/xl2roefact/)
- Surse GitHub (https://github.com/petre-renware/api_to_roefact/)
- Vedere de ansamblu pachet biblioteca Python
- Referinta API

3.1 Facilitati



Aceasta componenta este "totul despre crearea de facturi electronice" din formatul Excel office (xlsx). Aplicatia poate genera factura in format JSON, XML, PDF si o poate incarca in sistemul *RO E-Fact*¹.

Aceasta componenta ofera urmatoarele facilitati (acestea fiind obiectivele fundamentale ale componentei):

- transformarea facturilor din Excel in formatul XML cerut de catre sistemul ANAF RO E-Fact pentru incarcare
- incarcarea acestora in sistemul ANAF RO E-Fact¹
- transformarea facturilor din Excel intr-un format JSON intermediar, independent de platforma si care permite integrarea acestora cu alte sisteme (standard REST)
- **generarea facturii in format PDF** pentru transmiterea acesteia catre client, semnarea electronica, tiparirea si arhivarea acesteia in format fizic (in general manipularea facturii in format "human readable")

Componenta ofera doua instrumente pentru realizarea si indeplinirea acestor obiective:

- x12roefact o aplicatie de tip linie de comanda (disponibila pentru sistemele de operare Windows, Linux si MacOS)
- x12roefact PyPi **blioteca standard Python** utilizabila pentru dezvoltari proprii in scopul extinderii altor sisteme existente (*custom development*)

3.2 Instalarea aplicatiei xl2roefact

Instalarea aplicatiei xl2roefact este disponibila in urmatoarele variante:

- · pentru Windows:
 - MSI pachet instalare pentru Windows
 - EXE executabil Windows in format "portabil" (un singur fisier)
- pentru Linux:
 - ...in curind... DEB pachet instalare pentru Linux Debian
 - ...in curind... RPM pachet instalare pentru Linux
 - ...in curind... APPIMG executabil Linux in format "portabil" (un singur fisier)
- pentru Mac OS X
 - ...in curind... DMG pachet instalare pentru MacOS <!--
- ca script Python indiferent de sistemul de operare;
 - Pachet Python (https://pypi.org/project/xl2roefact/) biblioteca / libraria completa pe PyPi (inclusiv sursele)

Pentru acces la pachetele de instalare vezi sectiunea de descarcare resurse.

Note: * utilizarea ca script Python necesita existenta ca mediul Python3 min 3.10 sa fie instalat local * numele pachetelor includ versiunea de aplicatie utilizata si sistemul de operare pentru care sunt disponibile * pentru echivalent utilizare portabila pentru Linux se poate instala biblioteca Python dupa care devine utilizabil scriptul Python "ca orice alta comanda Linux"

3.3 Configurarea aplicatiei xl2roefact

Parametrii de configurare aplicatiei se gasesc in fisierul *config_settings.py*. Acestia sunt sub elaborati in limbaj Python prin utilizarea conventiilor de constante conform recomandarilor PEP (numele capitatlizat) si sunt acompaniti de linii de explicatii privind aplicabilitatea lor.

Configurare aplicatiei se poate face interactiv si din aplicatie. Pentru a obtine help referitor la detaliile comenzi se va folosi

```
xl2roefact settings --help
```

Configurarile existente si regulile recomandate in configurarea aplicatiei se afiseaza folosind comanda:

```
xl2roefact settings --rules
```

3.3.1 Configurarea din fisier extern

Configurarea aplicatuiei se poate face si prin intermediul unui fisier extern numit "sablon de configurare" (en: configuration template). Sablonul permite configurarea aplicatiei prin modificarea fragmentelor de text care trebuiesc cautate in fisierul Excel pentru identificarea diverselor informatii aferente facturii.

Sablonul este in format YAML (https://yaml.org/) iar informatiile ce trebuiesc descrise sunt explicate individual in comentarii insotitoare. De asemenea este util a fi citite si recomandarile date in pagina de descriere a aplicatiei.

Pentru a beneficia de cobfigurarile facute de dumneavoastra trebuie sa creati un fisier app_settings.yml in directorul curent din care lansati aplicatia, fisier ce contine noile configurari dorite. Numele fisierelui este obligatoriu a fi respectat.



Fisiere de configurare multiple

De retinut ca acest fisier este considerat (daca exista) cel din directorul curent de unde lansati aplicatia. Deci daca v-ati creat mai multe directoare de lucru (de exemplu pentru clienti diferiti) puteti crea fisiere de configurare specifice, cite unul in fiecare director.

Fisier de configurare global

In conditiile folosirii kitului MSI pentru o instalare locala a aplicatiei (cu utilizari multiple si repetate) si in situatia in care se doreste schimbarea configurarii implicite a aplicatiei se vor urma acesti pasi:

- in directorul de instalare a aplicatiei se va crea daca nu exita directorul data/
- in acest director se va crea un fisier app_settings.yml cu configurarea globala dorita

Aceasta configurare inlocuieste configurarea implicita si se va aplica global in utilizarea aplicatiei. In continuare configurarile existente in directorul curent suprascriu configurarea globala (se aplica cu precedenta).

Aici puteti gasiti pentru descarcare un model de sablon de configuare.

3.4 Utilizare nomenclator de furnizori

Aplicatia xl2roefact permite utilizarea datelor pentru furnizori din fisiere externe (in locul informatiilor din fisierele Excel) lucru ce poate fi folositor in urmatoarele situatii:

- cind utilizatorul aplicatiei o face in scopuri personale si multe facturi emise il au *pe el ca furnizor*. Aceast lucru permite ca informatia din Excel referitoare la furnizor sa fie sumara sau sa lipseasca, factura finala format PDF fiind generata cu aplicatia
- cind utilizatorul aplicatiei o foloseste pentru a emite facturi pentru alte firme si astfel este mai comod sa foloseasca fisiere cu datele acestor firme decit sa introduca informatia in fiecare factura
- cind se doreste ca datele furnizorului sa fie preluate dintr-un sistem extern ce le poate exporta ca si fisisre

3.4.1 Reguli generale de utilizare

Aceasta sectiune descrie regulile generale ce trebuiesc avute in vedere pentru o completa si corecta utilizare a facilitatii "Nomenclator furnizori":

- Nomenclatorul de furnizori se va completa intr-unul sau mai multe fisere de date (de tip text, vezi mai jos formatul exact).
- Un fisier acomodeaza un singur furnizor. Pentru mai multi furnizori se vor folosi fisiere diferite.
- Numele fisierului (fara extensie) trebuie sa coincida cu o cheie alternativa a furnizorului respectiv. Prin cheie alternativa se intelege acea cheie care este unica si poate asigura regasirea furnizorului prin folosirea ei. Ca si exemple din practicile curente ar fi cimpul numit uzual code sau code_name existent in mai toate sistemele de business. Acesta are avantajul unicitatii si a unei reprezentari "umane" (en: human readable). Desigur un cimp de tip cheie primara / ID este ideal dar de obicei acesta este tehnic iar valoarea sa nu ofera prea multe indicatii.
- Formatul fisierului este YAML (https://yaml.org/) standard, fara folosirea de modele de date complexe, aatfel incit o eventuala conversie JSON <--> YAML sa poata fi realizata manual in ambele sensuri si fara necessitatea unor cunostinte avansate ci la nivel de redefinire a numelor cheilor.

3.4.2 Locatia nomenclatorului

Fisierele cu datele furnizorilor pot sta in urmatoarele locatii:

- directorul curent este locatia cu prioritatea maxima si in caz de "duplicate" ale unui fisier, cel de aici va fi luat in considerare
- directorul data/ din locatia unde este instalata aplicatia

Recomandari si practici uzuale:

- In situatiile in care sistemul este instalat pe un computer ce se foloseste frecvent cu aplicatia xl2roefact si exista un set de furnizori frecvent folositi se recomanda folosirea directorului data/ pentru stocarea fisierelor nomenclator astfel incit sa poata fi refolosite usor.
- In situatia folosirii a "multe" fisiere date furnizori se recomanda crearea unui director dedicat in locatia utilizata (vezi mai sus) si acesta sa fie referit in numle fisierului.

3.4.3 Utilizarea nomenclatorului

Pentru a folosi cu aplicatia un fisier tip nomenclator furnizor se va utiliza optiunea:

```
xl2roefact xl2json -o fisier_furnizor
```

unde fisier_furnizor este numele fisierului ce contine datele unui furnizor. Locatia acestui fisier este relativa la locatia considerata pentru folosire

3.4.4 Sablon pentru nomenclator de furnizori

Sablonul este proiectat pentru utilizarea in facturile emise si contine numai informatiile necesare in acest scop. Astfel cimpurile existente trebuiesc pastrate, adica nu vor fi sterse.

Vor fi respectate si completate corespunzator cimpurile specificate ca obligatoriii (en: mandatory in comentariile aferente fiecarui cimp.

Pentru acele cimpuri pentru care informatia este necunoscuta sau considerata irelevanta se va completa cu

Se vor putea adauga orice alte cimpuri suplimentare cu conditia sa fie respectat formatul fisierului (YAML). acestea nu vor fi folosite de catre aplicatie, ci pur si simplu ignorate.

Aici puteti gasiti un model de sablon de configuare.

3.5 Comenzile aplicatiei

Interfata aplicatie este realizata utilizind conventiile si practicile uzuale pentru aplicatii tip linie de comanda consola. Pentru informatii privind comenzile se poate folosi optiunea de **help**, dispobilia atit la nivelul general:

```
x12roefact --help
```

cit si la nivel detaliat pentru fiecare comanda

```
x12roefact [COMMAND] --help
```

Lista comenzilor:

- about Afiseaza informatii despre aceatsa aplicatie (copyright, scop, etc)
- settings _ Afiseaza parametrii de configurare a aplicatiei. Vezi sectiunea de configurare a aplicatiei
- xl2json Transforma fisierul (fisierele) Excel in forma JSON pentru utilizare ulterioara ca forma de date standardizat pentru schimbul de informatii cu alte sisteme electronice

Comenzile detaliate:

3.5.1 xl2roefact

function called when no command is invoked and to provide only application version (for external users to test it!).

Usage:

```
xl2roefact [OPTIONS] COMMAND [ARGS]...
```

Options:

```
--version show application version
--install-completion Install completion for the current shell.
--show-completion Show completion for the current shell, to copy it or customize the installation.
```

3.5.1.1 about

provide a short application description.

Usage:

```
x12roefact about [OPTIONS]
```

3.5.1.2 settings

display application configuration parameters and settings that are subject to be changed by user.

Args: rules: show recommended rules to follow when change application configurable settings (available in both RO & EN languages). Defaults to False.

Usage:

```
xl2roefact settings [OPTIONS]
```

Options:

```
-r, --rules show settings recommended update rules
```

3.5.1.3 xl2json

extract data from an Excel file (save data to JSON format file with the same name as original file but .json extension).

Args: file_name: files to process (wildcards allowed). files_directory: directory to be used to look for Excel files. Defaults to invoice_files/. NOTE: if default directory does not exists will consider current directory instead verbose: show detailed processing messages". Defaults to False.

Usage:

```
xl2roefact xl2json [OPTIONS] [FILE_NAME]
```

Options:

3.6 Practici si regului referitoare la continutul facturilor din Excel

Acest capitol se refera la modul in care este "tratat" continutul fisierului Excel cu factura, mai exact la modalitatea in care informatia facturii este cautata, identificata si gasita in scopul de a fi salvata in oricare din formatele de "factura electronica / E-Fact".

Utilizarea sablonului de factura Excel ce este livrat impreuna cu aplicatia **ESTE O VARIANTA DE LUCRU RECOMANDATA**, dar nu obligatorie. Chiar si in cazul utilizarii acestuia, prin modificarea "structurii" acestuia, informatia poate ajunge *nerecognoscibila / neidentificabila* total sau partial daca nu sunt urmate regulile expuse.

In general trebuie facuta diferenta intre datele facturii si modul in care aceasta va fi tiparita (va aparea la tiparire / previzualizare).

Mai exact **continutul informational** al facturii nu trebuie nici confundat si nici mixat cu **formatul de afisare al acesteia** (layout). Pentru acesta din urma se recomanda a fi folosite cu precadere *regulile de formatare* din Excel si nu cele stocare a datelor. Un exemplu este un numar zecimal oarecare unde:

- una este valoarea introdusa intr-o celula (de ex cu 3 zecimale) si
- alta este valoarea afisata (cu 2 zecimale) aceasta din urma trebuie obtinuta prin formatarea celulei respective de a afisa 2 zecimale prin rotunjire insa valoarea efectiva trebuie sa fie cea originala cu 3 zecimale, lucru (diferenta) care se poate vedea la editarea continutului celulei.

3.6.1 Reguli recomamdate in configurarea aplicatiei pe specificul Excel al facturilor dumneavoastra

Reguli recomandate pentru adaptarea aplicatiei la modelul dvs de factura in Excel:

- fiecare parametru are un hep scurt (liniile ce incep cu caracterul #) citi-l inainte de a modifica uun parametru
- nu schimbati numele parametrilor asa cum este el specificat inainte de semnul egal (=)
- listele sunt incluse intre paranteze drepte ([...]) si elementele lor sunt separate prin caracterul virgula (,)
- sirurile de caractere sunt incluse intre ghilimele (caracterul ")
- daca doriti stergerea unei listei (de ex daca nu doriti nici o optiune pentru acea lista) doar lasati acel parametru cu valoarea [] nu stergeti in nici un caz acel parametru
- nu adaugati parametrii suplimentari (altii decit cei specificati aici), acestia nu vor fi utilizati fara a modifica aplicatia (de asemenea riscati sa induceti erori in cod)
- pentru datele calendaristice in celulul Excel a se utiliza formatul standard de data (date) si modificati formatul de afisare in formatul dorit pe factura tiparibila

(en-us) Recommended rules to configure the application to your Excel invoice model:

- each parameter has a short help (lines starting with # character) read it before changing that parameter
- do not change parametrs name as specified before equal (=) sign
- lists are enclosed in squured brackets ([. . .]) and items are separated by comma character (,)
- strings are enclosed in " characters

- if you want to clear a list (for example you do not wants any options inside) just let it as <PARAMETR NAME> = [] do not drop that parameter
- do not add supplementary parameters, they will not be used without software changes (also risk to induce potential errors)
- for calendaristic dates Excel cells use date format and change it as display option to show wanted format

3.7 Tutorial utilizare aplicatie

3.7.1 Organizarea informatiei

Aplicatia xl2roefact "promoveaza" structurarea informatiei procesate astfel incit sa fie evitata situatia "de aglomerare" a directorului curent cu fisiere ce trebuiesc identificate si izolate in situatia in care se fac procesari in masa (pe mai multe fisiere / facturi sursa).

Astfel, aplicatia se asteapa ca fisierele Excel sursa (adica facturile de procesat) sa fie copiate in directorul invoice_files/ de unde vor fi citite si tot aici vor fi create fisierele rezultate (JSON, XML, etc). Acest director este relativ la directorul curent de unde este lansata aplicatia si considerat "implicit" cu acest nume dar daca se doreste un alt director acest lucru poate fi facut folosind parametrul --files-directory (sau prescurtat -d) la lansarea aplicatiei astfel:

```
xl2roefact -d "calea si numele directorului dorit"
```



Ghilimelele sunt necesare numai daca numele si calea (path) contin caracterul spatiu.

Exemple:

pentru stabilirea directorului curent ca sursa pentru fisierele factura Excel:

```
xl2roefact -d ./
```

• procesarea tuturor facturilor facturilor din luna iunie, copiate intr-un director dedicat sub directorul curent:

```
xl2roefact -d ./facturi_iunie/
```

3.7.2 Exemplu de procesare a unei facturi

· se creaza directorul recomandat pentru stocarea facturilor in Excel:

```
md invoice_files
```

- se copiaza factura factura_A.xlsx in acest director apoi se revine in directorul anterior daca acesta a fost schimbat pentru efectuarea copierii
- se lanseaza aplicatia:

```
xl2roefact xl2json
```

In urma acestor operatii, in directorul invoice_files vor rezulta:

- factura_A.xlsx ca fiind fisierul Excel original cu factura
- factura_A.json acesta fiind fisierul format JSON rezultat in urma procesarii si ce poate fi folosit pentru interschimbarea electronica a informatiei intre sisteme

3.8 Aspecte tehnice referitoare la formatul fisierului JSON aferent facturii

Acest fisier este cel generat de catre aplicatie in urma executiei acesteia cu comanda x12 j son . Formatul JSON are urmatoarra structura de baza:

```
{
    "Invoice": {...},
    "meta_info": {...},
    "excel_original_data": {...}
}
```

Cheile de la primul nivel contin:

- Invoice datele efective ale facturii
- meta_info
 - informatii referitoare la procesarea facturii si mapa de conversie a cheii Invoice din formatul JSON in formatul XML cerut de sistemul RO E-Fact
 - harta de ajutor in conversia formatului JSON in formatul XML acceptat de sistemul RO E-Fact (cheie meta_info.map_JSONkeys_XMLtags) si definititiile XML aferente (cheie meta_info.invoice_XML_schemes)
 - alte informatii despre fisierul Excel prelucrat (numele, worksheet cu factura, data si ora procesarii, CRC pentru verificare, etc)
- excel_original_data informatiile originale din fisierul Excel, asa cum au fost ele identificate si gasite precum si locatia (adresele celulelor). Aceste informatii sunt utile in cazul in care exista neclaritati in urma procesuluicde conversie pentru "a intelege" de unde si cum arata informatiile originale din fisierul Excel

Pentru detalii suplimentare despre formatul JSON trebyie consultata componenta referitoare la *biblioteca x12roefact destinata dezvoltarii* software.

3.9 Descarcare (download) aplicatie xl2roefact CLI

- · Pachet instalare aplicatie Windows
- Pachet instalare script Python
- Model de sablon de configuare

3.10 Date identificare

- part number (p/n): 0000-0095-x12roefact
- · producator si copyright: RENWare Software Systems
- author: Petre Iordanescu (petre.iordanescu@gmail.com)

3.11 License

3.12 Note

1. Toate interactiunile cu sistemul ANAF RO E-Fact necesita o conexiune la internet si un set de credentiale ANAF RO E-Fact ale companiei pentru care se incarca factura. In lipsa acestora, fisierul XML generat de aplicatie poate fi incarcat ulterior (de ex de catre departmentul contabilitate) ← ←

III. web2roefact

4 Under construction page



UPCOMING...

IV. xl2roefact python library

5 xl2roefact python library

- · xl2roefact python library
 - · Library modules
 - · Install library
 - · Install from PyPi
 - · Install from distribution packages
 - · Aspecte tehnice referitoare la formatul fisierului JSON aferent facturii
 - API Reference
 - · Download xl2roefact library

5.1 Library modules

x12roefact library (package) modules are:

- rdiny read an Excel file and extract invoice data to a JSON file format
- wrxml write, convert the JSON invoice file to a XML file format, respecting schemes required by RO EFact standard
- chkxml check generated XML file
- ldxml load an invoice (ie, its XML associated file) to ANAF SPV system
- chkisld check if an invoice is already loaded in ANAF SPV system
- config_settings define system settings & parameters mainly used in invoice info / data detection and extract from invoice Excel format file
- app_cli contains the code for x12roefact application command line (CLI) format

Below is presented the *skeleton logic* of those modules which and where is relevant ie meaning where is not enough obvious from code or code complexity exceed usual limits (*for example nore than 100 lines of code per function*). For more technical details and specification regarding modules see API Reference

5.2 Install library

Library can be installed using 2 methods:

- · install from PyPi
- · install from distribution packages

5.2.1 Install from PyPi

The library installation should be done using standard Python instruments:

```
pip install xl2roefact
```

5.2.2 Install from distribution packages

To install from distribution packages first download the package version intended to install (see download section), choose the package type (if you have no special option, then choose WHEEL format) and install it using pip as any other Python library installation (detailed in Python official documentation).

5.3 Aspecte tehnice referitoare la formatul fisierului JSON aferent facturii

Acest fisier este cel generat de catre aplicatie in urma executiei acesteia cu comanda x12json. Structura de baza a acestui fisier este:

```
{
    "Invoice": {...},
    "meta_info": {...},
    "excel_original_data": {...}
}
```

Cheile de la primul nivel contin:

- Invoice datele efective ale facturii
- meta_info
 - informatii referitoare la procesarea facturii si mapa de conversie a cheii Invoice din formatul JSON in formatul XML cerut de sistemul RO E-Fact
 - harta de ajutor in conversia formatului JSON in formatul XML acceptat de sistemul RO E-Fact (cheie meta_info.map_JSONkeys_XMLtags) si definititiile XML aferente (cheie meta_info.invoice_XML_schemes)
 - alte informatii despre fisierul Excel prelucrat (numele, worksheet cu factura, data si ora procesarii, CRC pentru verificare, etc)
- excel_original_data informatiile originale din fisierul Excel, asa cum au fost ele identificate si gasite precum si locatia (adresele celulelor). Aceste informatii sunt utile in cazul in care exista neclaritati in urma procesuluicde conversie pentru "a intelege" de unde si cum arata informatiile originale din fisierul Excel

An example of JSON generated file is available here

5.4 API Reference

5.5 Download xl2roefact library

· Pachete instalare biblioteca Python formate WHEEL si DIST

6 xl2roefact python library API Reference

- xl2roefact python library API Reference
- _version__
 - __version__
 - normalized_version
- app_cli
 - about
 - settings
 - xl2json
 - called_when_no_command
 - run
- __init__
 - __version__
- __main__
- Idxml
- wrxml
- rdinv
 - rdinv
 - get_excel_data_at_label
 - mk_kv_invoice_items_area
 - get_invoice_items_area
 - get_merged_cells_tobe_changed
 - build_meta_info_key
 - get_partner_data
- chkxml
- chkisld
- libutils
 - hier_get_data_file
 - complete_sexe_file
 - invoice_taxes_summary
 - dict_sum_by_key
 - isnumber

- find_str_in_list
- · config_settings
 - DEFAULT_SUPPLIER_COUNTRY
 - python_object
- data

7 __version__

xl2roefact version info.

```
####### #####
####### ####
# ## # # #
            # # ## ##
           ### ### # ## #
##
  ## # #
## ## # #
## ## # #
            # # # ## #
            # # # ## #
# ## # # ####
            # # # ## #
# ## # # #
             # # ## ##
####### #######
             ####
                ######
           ####### ###### ##### ##### ######
###### ##### # # # # # ## ## ## ## ##
# ## # # # # # # # # # #
                        # # ##### # #
 # #
```

7.0.0.1 __version__

last.released "0.5.3rc1"

7.0.0.2 normalized_version

```
def normalized_version(raw_version: str = __version__) -> str
```

transform version string in canonical form.

```
Usage:- import x12roefact - x12roefact.__version__.normalized_version()
```

Arguments:

raw_version (str): a raw version string. Defaults to package current version string.

Returns:

str: canonical version string

8 app_cli

app_cli: the command line application for all xl2roefact functionalities.

Identification:

- copyright: (c) 2023 RENWare Software Systems
- author: Petre Iordanescu (petre.iordanescu@gmail.com)

8.0.0.1 about

```
@app_cli.command()
def about()
```

Provide a short application description.

8.0.0.2 settings

```
@app_cli.command()
def settings(rules: Annotated[
    bool,
    typer.
    Option("--rules", "-r", help="show settings recommended update rules"),
] = False)
```

Display application configuration parameters and settings that are subject to be changed by user.

Arguments:

• rules - show recommended rules to follow when change application configurable settings (available in both RO & EN languages). Defaults to False.

8.0.0.3 xl2json

```
@app_cli.command()
def x12json(
    file_name: Annotated[
        str, typer.Argument(
            help="files to process (wildcards allowed)")] = "*.xlsx",
    files_directory: Annotated[
        Path,
        typer.Option(
            "--files-directory",
            "-d",
            exists=False,
            file_okay=False,
            dir_okay=True,
            writable=True,
            readable=True,
            resolve_path=True,
            "directory to be used to look for Excel files (if default directory does not exists
will consider current directory instead)."
        ),
    ] = "invoice_files/",
    owner_datafile: Annotated[
       Path,
        typer.Option(
            "--owner-datafile",
            "-o",
            exists=False,
            file_okay=False,
            dir_okay=False,
            writable=False,
            readable=True,
            resolve_path=False,
            help="File to read invoice supplier (owner) data instead Excel."),
    ] = None,
    verbose: Annotated[
       bool,
        typer.
        Option("--verbose", "-v", help="show detailed processing messages"),
    ] = False)
```

Extract data from an Excel file (save data to JSON format file with the same name as original file but .json extension).

Arguments:

- file_name files to process (wildcards allowed).
- files_directory directory to be used to look for Excel files. Defaults to invoice_files/. NOTE: if default directory does not exists will consider current directory instead
- owner_datafile File to read invoice supplier (owner) data instead Excel.
- verbose show detailed processing messages". Defaults to False.

8.0.0.4 called_when_no_command

```
@app_cli.callback(invoke_without_command=True)
def called_when_no_command(
   ctx: typer.Context,
   version: Annotated[
        bool,
        typer.Option("--version", "-V", help="show application version"),
] = False)
```

Application global information (command agnostic).

8.0.0.5 run

NOTE: for run "reason to be" as copy of app_cli see iss 0.1.22b 240216piu_a

9 __init__

9.0.0.1 __version__

default conversion takes place over xl2roefact actual version

10 __main__

xl2roefact.main: Python package standard file to assure run as python -m x12roefact.

Identification:

- code-name: __main__
- copyright: (c) 2023 RENWare Software Systems
- author: Petre Iordanescu (petre.iordanescu@gmail.com)

Deployments:

- · Windows: MSI installer with EXE application.
- Linux: x12roefact executable shell as wrapper for x12roefact.py.

Specifications:

- command general format: python -m x12roefact [OPTIONS] COMMAND [ARGS]....
- help: python -m xl2roefact --help.

11 Idxml

ldxml: modul de incarcare a facturii in sistemul ANAF E-Factura

Identification:

- code-name: ldxml
- copyright: (c) 2023 RENWare Software Systems
- author: Petre Iordanescu (petre.iordanescu@gmail.com)

Specifications:

- document cerinte initiale: 110-SRE-api_to_roefact_requirements.md section Componenta x12roefact
- INTRARI: fisier f-XML
- · IESIRI: raport cu validarea si identificatorul incarcarii

12 wrxml

wrxml: modul de generare a fisierului format XML

Identification:

- code-name: wrxml
- copyright: (c) 2023 RENWare Software Systems
- author: Petre lordanescu (petre.iordanescu@gmail.com)

Specifications:

- document cerinte initiale: 110-SRE-api_to_roefact_requirements.md section Componenta xl2roefact
- INTRARI: fisier f-JSON
- IESIRI: fisier format XML conform cerintelor si sistemului ANAF E-Factura (cod: f-XML)

13 rdinv

rdinv: modul de procesare a fisierului Excel ce contine factura si colectare a datelor aferente.

Formatul acceptat fisier Excel este XLSX.

Identification:

- code-name: rdinv
- copyright: (c) 2023 RENWare Software Systems
- · author: Petre Iordanescu (petre.iordanescu@gmail.com)

Specifications:

- document cerinte initiale: 110-SRE-api_to_roefact_requirements.md section Componenta xl2roefact
- INTRARI: fisier format XLSX ce contine factura emisa (cod: f-XLSX)
- IESIRI: fisier format JSON imagine a datelor facturii (cod: f-JSON)

13.0.0.1 rdinv

```
def rdinv(file_to_process: str,
    invoice_worksheet_name: str = None,
    *,
    debug_info: bool = False,
    owner_datafile: Path = None) -> dict
```

read Excel file for invoice data.

Produce a dictionary structure + JSON file with all data regarding read invoice: canonical KV data, meta data, map to convert to XML and original Excel data.

Arguments:

- file_to_process the invoice file (exact file with path).
- invoice_worksheet_name the worksheet containing invoice, optional, defaults to first found worksheet.
- debug_info key only, show debugging information, default False.
- owner_datafile specify a file to read supplier data from, default None meaning to read supplier data from
 Excel file

Returns:

• dict - the invoice extracted information from Excel file as dict(Invoice: dict, meta_info: dict, excel_original_data: dict)

NOTE ref important variables: * db: pylightxl object: EXCEL object with invoice (as a whole) * ws: pylightxl object: WORKSHEET object with invoice

13.0.0.2 get_excel_data_at_label

get "one key Excel values", like invoice number or invoice issue date.

Arguments:

- pattern_to_search_for for example for inv number, will pass the PATTERN_FOR_INVOICE_NUMBER_LABEL.
- worksheet the worksheet containing invoice (as object of pyxllight library).
- area_to_scan area of cells to be searched, default whole worksheet.
- targeted_type what type expect (will try to convert to, if cannot will return str), default str.
- down_search_try establish if DOWN search method is tried, default True.

Returns:

None if not found OR dictionary containing: * "value": int | float | str - the value found covenred to requested targeted_type if possible or str otherwise; if "out of space" then returns None * "location": (row, col) - adrees of cell where found value

Notes:

normal scan order is 1.RIGHT, 2.DOWN (if allowed), 3.IN-LABEL only in given area and pattern.

13.0.0.3 mk_kv_invoice_items_area

```
def mk_kv_invoice_items_area(invoice_items_area_xl_format) -> dict
```

transform invoice_items_area in "canonical JSON format" (as kv pairs).

Arguments:

• invoice_items_area_xl_format - invoice items area in Excel format (ie, DataFrame with row, col, data).

Returns:

• invoice_items_area_xl_format - dictionary with invoice items in Excel format (ie, rows, columns).

Notes:

• for ROefact XML model (& plan) see invoice_files/__model_test_factura_generat_anaf.xml.

13.0.0.4 get_invoice_items_area

get invoice for invoice_items_area, process it and return its Excel format.

Process steps & notes:

- · find invoice items subtable.
- · clean invoice items subtable.
- · extract relevenat data.
- NOTE: all Excel cell addresses are in (row, col) format (ie, Not Excel format like "A:26, C:42, ...")

Arguments:

- worksheet the worksheet containing invoice (as object of pyxllight library).
- invoice_items_area_marker string with exact marker of invoice items table.
- NOTE this is the UPPER-LEFT corner and is determined before calling this procedure.
- wks_name the wroksheet name (string) of the worksheet object.

Returns:

invoice_items_area - dictionary with invoice items in Excel format (ie, rows, columns).

13.0.0.5 get_merged_cells_tobe_changed

scan Excel file to detect all merged ranges.

Arguments:

- file_to_scan the excel file to be scanned.
- invoice_worksheet_name the worksheet to be scanned.
- keep_cells_of_items_ssd_marker tuple with cells that will be marked IN ANY CASE to be preserved:
- use case: to keep all potential invoice items ssd rows.
- format: tuple(row, col, val) where row & col are relevant here
- default: None

Returns:

• cells_to_be_changed - list with cells that need to be chaged in format (row, col).

Notes:

- function is intended to be used ONLY internal in this module.
- use openpyx1 library to do its job.

13.0.0.6 build_meta_info_key

build meta_info key to preserve processed Excel file meta information: start address, size.

Notes:

- (1.) all cell addresses are in format (row, col) and are absolute (ie, valid for whole Excel file).
- (2.) this function is designed to be used internally by current module (using outside it is not guaranteed for information 'quality').

Arguments:

- excel_file_to_process name of file to process as would appear in meta_info key.
- invoice_worksheet_name the worksheet name as would appear in meta_info key.

- ws_size worksheet size as would appear in meta_info key (index 0 max rows, index 1 max columns).
- keyword_for_items_table_marker the content of cell used as start of invoice items subtable as would appear
 in meta info.
- found_cell position of cell used as start of invoice items subtable as would appear in meta_info key (index 0 row, index 1 column).

Returns:

meta_info dictionary built with meta information to be incorpoarted in final invoice dict

13.0.0.7 get_partner_data

Get invoice partener data from Excel.

Notes:

- for developers: function works by generating side effects and must be located in rdinv.py
- side effects: this function works by directly modifying param_invoice_header_area sent parameter
- supplier_datafile exception: if file is not found or cannot be read, this function will force complete application termination (sys.exit)

Arguments:

- partner_type one of "CUSTOMER", "SUPPLIER" or "OWNER" to specify for what kind of parner get data. The value "OWNER" is designed to get data from an outside database / file (master data)
- wks current work-on pylightxl Worksheet object
- param_invoice_header_area mode IN-OUT, outside param_invoice_header_area as used and needed in rdinv(). This function will write back in this variable
- supplier_datafile for partner_type = "CUSTOMER" here is expected the file where to get supplier data

Returns:

None - all data is produced directly in parameters as side effect

14 chkxml

chkxml: modul de validare a facturii in sistemul ANAF E-Factura

Identification:

- code-name: chkxml
- copyright: (c) 2023 RENWare Software Systems
- author: Petre Iordanescu (petre.iordanescu@gmail.com)

Specifications:

- document cerinte initiale: 110-SRE-api_to_roefact_requirements.md section Componenta xl2roefact
- INTRARI: fisier f-XML
- IESIRI: raport cu eventualele erori de validare

15 chkisld

chkisld: modul de verificare a starii de incarcare a unei facturi emise

Identification:

- code-name: chkisld
- copyright: (c) 2023 RENWare Software Systems
- author: Petre Iordanescu (petre.iordanescu@gmail.com)

Specifications:

- document cerinte initiale: 110-SRE-api_to_roefact_requirements.md section Componenta xl2roefact
- INTRARI: fisier f-XLSX sau numarul / cheia / codul facturii
- IESIRI: valoarea echivalent TRUE daca factura a fost deja incarcata sau valoare echivalent FALSE daca factura nu a fost incarcata

16 libutils

general utilities library for all x12roefact components and modules.

Identification:

- code-name: libutils
- copyright: (c) 2023, 2024 RENWare Software Systems
- · author: Petre Iordanescu (petre.iordanescu@gmail.com)

Components:

- complete_sexe_file() -> bool:Rename and move resulted exe file (called from build_sexe script)
- dict_sum_by_key(dict, str) -> float:Sum a dictionary for a given key at all depth levels
- find_str_in_list(list, list) -> int: Search more strings (ie, a list) in list of strings

- hier_get_data_file(file_name: str) -> Path:Get Path(file_name) from hierarchy of locations
- invoice_taxes_summary(list[dict]) -> dict: Calculates invoice taxes summary as required by ROefact requirements
- isnumber(str) -> bool: Test a string if it could be used as number (int or float)

16.0.0.1 hier_get_data_file

```
def hier_get_data_file(file_name: str) -> Path | None
```

Get Path(file_name) from hierarchy of locations: (1) current directory, (2) package data/ directory, (3) None is file does not exists in 1 or 2 locations.

Arguments:

• file_name - the name of the file to be returned as full path

Returns:

• Path - path of file if was found in (1) or (2) locations or None if not found

16.0.0.2 complete_sexe_file

```
def complete_sexe_file(drop_source: bool = True) -> bool
```

Rename and move resulted exe file. This function is dedicated only to development phase, so various objects are hard coded.

- Specs: file to process .../dist_sexe/xl2roefact_to_update_name.exe --> `.../dist/xl2roefact-version-win64.exe
- NOTE: all function code suppose that current directory is root of x12roefact, ie where is located pyproject.toml of package

Arguments:

• drop_source - indicate to delete source file after copying, ie make a "move" operation, otherwise make a copy keeping the source file. Default behaviour is to delete source.

Returns:

bool - True if file was found, renamed and moved with no error

16.0.0.3 invoice_taxes_summary

```
def invoice_taxes_summary(invoice_lines: list[dict]) -> list
```

Calculates invoice taxes summary as required by ROefact requirements.

Arguments:

invoice_lines - section with item lines from 'big' invoice dictionary

Returns:

list - usable for "cac_TaxSubtotal" key

16.0.0.4 dict_sum_by_key

```
def dict_sum_by_key(search_dict: dict | list[dict], sum_key: str) -> float
```

Sum all dictionary (or list off dictionaries) items, at all levels, for a given key.

Arguments:

- search_dict dictionary to be searched for
- sum_key key to be searched

Returns:

• float - with required sum

16.0.0.5 isnumber

```
def isnumber(a_string: str) -> bool
```

test if a string is valid as any kind of number.

Arguments:

• a_string - input string.

Returns:

• True - if input string is valid as any kind of number, orherwise False.

16.0.0.6 find_str_in_list

```
def find_str_in_list(list_of_str_to_find: list, list_to_search: list) -> int
```

find a substring from list_of_str_to_find in elements of list_to_search.

Arguments:

- list_of_str_to_find list of strings to search for.
- list_to_search liste where to search for substrings.

Returns:

• index - the index of list item which contains str_to_find (first found) or None if not found.

17 config_settings

Configuration and setting parameters.

Regulile recomandate se gasessc in documentul (recommended rules are in document x12roefact/data/README_app_config_rules.md)

Public objects:

`rules_content`: contains the rules text (rendered)

- copyright: (c) 2023 RENWare Software Systems
- author: Petre Iordanescu (petre.iordanescu@gmail.com)

17.0.0.1 DEFAULT_SUPPLIER_COUNTRY

NOTE: "pattern-uri" (sabloane) de identificare si regasire a datelor folositi de

__comanda x12json reprezentind functionalitatea de extragere a datelor din Excel si exportul lor in formatul JSON (modulul `rdinv)__

17.0.0.2 python_object

suppose no settings loaded

18 data

V. invoice template

Copyright (C) RENware Software Systems

19 invoice template

- · invoice template
 - Instalarea sablonului de factura emisa
 - Recomandari in utilizarea sablonului
 - Descarcare (download) sablon factura
 - License

versiune curenta 0.1.20 formate suportate XLSX

19.1 Instalarea sablonului de factura emisa

Aceasta componenta consta dintr-un director (ce nu necesita instalare speciala ci simpla copiere locala acolo unde va fi utilizat). Acest director contine:

- fisierul pentru factura invoice_template_CU_tva.xlsx ce este disponibil pentru descarcare aici
- directorul released_packages/ ce contine versiuni anterioare de sablon ce sunt inca suportate
- · prezentul document

19.2 Recomandari in utilizarea sablonului

Aceasta sectiune se refera la modul in care ar trebui "tratat" continutul fisierului Excel cu factura *in conditiile in care se intentioneaza ca aceasta sa fi procesata ulterior cu sistemul INVOICEtoROeFact*. Acest sablon este general valabil (este un fisier Excel ca oricare altul) deci in acest caz este important a "constientiza" faptul ca informatia aferenta facturii din Excel va fi cautata, identificata si gasita in scopul de a fi salvata in formatele de factura electronica (utilizarea acestui sablon de factura Excel impreuna cu sistemul INVOICETOROeFact ESTE O VARIANTA DE LUCRU RECOMANDATA, dar nu obligatorie).

Astfel se recomanda ca acest sablon sa fie utilizat asa cum este livrat, fara a efectua modificari majore in structura sa cum ar fi:

- modificarea formatelor (de tip de date) celulelor in scopul unei afisari "mai frumoase"
- adaugarea de informatii prin concatenare de siruri de caractere sau orice alte metode de a altera continutul vizibil al celulelor in scopul unei afisari "mai frumoase"
- modificarea locatiilor celulelor prin inserarea sau stergerea de linii, coloane sau celule noi

In general trebuie facuta diferenta intre datele facturii si modul in care aceasta va fi tiparita (va aparea la tiparire / previzualizare).

DETALII TEHNICE:

Continutul informational al facturii nu trebuie nici confundat si nici mixat cu **formatul de afisare al acesteia** (layout). Pentru acesta din urma se recomanda a fi folosite cu precadere *regulile de formatare* din Excel si nu cele stocare a datelor. Un exemplu este un numar zecimal oarecare unde:

- una este valoarea introdusa intr-o celula (de ex cu 3 zecimale) si
- alta este valoarea afisata (cu 2 zecimale) aceasta din urma trebuie obtinuta prin formatarea celulei respective de a afisa 2 zecimale prin rotunjire insa valoarea efectiva trebuie sa fie cea originala cu 3 zecimale, lucru (diferenta) care se poate vedea la editarea continutului celulei.

19.3 Descarcare (download) sablon factura

office Excel XLSX

19.4 License

VI. Help

VI.I Manuale web2roefact

INVOICE to RO E-Fact to ACTivent Soldier

INVOICEtoROefact System

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20 Catalogul manualelor de utilizare

Cuprins:

- Catalogul manualelor de utilizare
- ..

INVOICE to RO E-Fact to ROWNER Solver Colore

INVOICEtoROefact System

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21 Catalogul manualelor de configurare si administrare

Cuprins:

- Catalogul manualelor de configurare si administrare
- ...

VI.II Cerintele sistemului

RENware Software Systems

22 Propunere tehnica

Cuprins:

- · Propunere tehnica
 - · Aria de cuprindere
 - Considerente generale de securitate
 - Considerente generale privind bazele de date proprii sistemelor
 - · Considerente generale privind auditarea informatiilor
- Client: n/a not public
- Data: 2023-Noiembrie
 - Codific

Codificarea documentelor

• codificarea numelor documentelor si a proceselor este facuta in conformitate cu metodologia RENware SDEVEN (http://sdeven.renware.eu)

Cuprins:

- · Propunere tehnica
 - · Aria de cuprindere
 - · Considerente generale de securitate
 - Considerente generale privind bazele de date proprii sistemelor
 - · Considerente generale privind auditarea informatiilor

22.1 Aria de cuprindere

Solutiile propuse prin aceasta propunere tehnica sunt:

- INVOICEtoROefact (code-name api_to_roefact) integrare Sistemul National de Facturi Emise RO e-Factura descriere si cerinte aici
- PayValidaBoa (code-name payments_validation_board) Flux aprobare facturi primite pentru ordonantare la plata descriere si cerinte aici

In continuare se prezinta o serie de considerente generale valabile pentru toate sistemele din aria de acoperire.

22.2 Considerente generale de securitate

- (RSEC-01) fisierele de configurare a sistemelor (fiind format text UTF-8) vor avea ca owner un utilizator dedicat sistemului respectiv sau utilizatorul root. Numai acesti doi utilizatori pot avea acces RW la aceste fisiere
- (RSEC-02) toate documentele de provenienta externa sistemelor vor fi "purtatoare" ale unui certificat digital ce atesta validitatea documentelor. Acest certificat va fi de preferinta de tip "semnatura electronica" dar nu obligatoriu calificata. Este suficient un simplu certificat (cheie) tip RSA generat intern si distribuit utilizatorilor autorizati sa emita documentele respective. O copie a certificatului (sau a certificatelor daca se vor emite mai multe) ce atesta validitatea unui document va sta pe server in locatii ce sunt conforme cu RSEC-01

22.3 Considerente generale privind bazele de date proprii sistemelor

- (DBS-01) bazele de date vor contine o cheie primara "real primara" (adica avind toate caracteristicile tehnice pentru PK in sensul uzual cunoscut din teoria bazalor de date). Aceasta cheie va fi de tip Char (32) reprezentind tipul uuid4 (cunoscut si ca guid) convertit la sir de caractere UTF-8 si reversibil ca transformare din string in uuid4. Aceasta cheie va fi generata automat si intretinuta de sistem deservind scopuri pur tehnice de referentiere si relationare a datelor. Modificarea manuala nu este permisa putind genera situatii de hazard.
- (DBS-02) bazele de date vor contine si o alta "cheie primara uman recongnoscibila" (AK in teoria bazelor de date) utilizata in scop de recunoastere si regasire a informatiei de catre utilizatori. Aceasta cheie va avea urmatoarele catacterisrici:
 - va fi unica, tip Char (10) (limitarea lungimii se va aplica la introducerea datelo si nu in baza de date)
 - agnostic case, nu se va face diferenta intre litere mari sau mici (pentru a evita confuziile)
 - obligatorie iar daca utilizatorul "nu o doreste" se va default-a la PK-ul anterior
- (DBS-03) bazele de date vor fi intr-unul din formatele: (a) relational sau (b) JSON standard. Pentru bazele de date in format relational va fi preferata o solutie de SGBD tip open source matura, intretinuta in urmatoarea ordine de aplicare:
 - 1. SQLite (https://www.sqlite.org/index.html) pentru baze de date ce nu vor depasi 10,000 de inregistrari
 - 2. PostgreSQL (https://www.postgresql.org/) pentru baze de date ce se esttimeaza ca vor depasi 10,000 de inregistrari
 - 3. MariaDB (https://mariadb.org/) pentru baze de date ce se esttimeaza ca vor depasi 10,000 de inregistrari
 - prima varianta va fi preferata datoritra "portabilitatii datelor"
 - a treia varianta este enumerata ca optiune preferata a utilizatorului la varianta 2.
- (DBS-04) bazele de date vor folosi numai cimpuri formate standard, clasice si elemetare:
 - sir de carectere (CHAR sau VARCHAR)
 - numere intregi cu semn (INTEGER)
 - numere reale cu semn (FLOAT)

- numere combinate a caror valoare poate fi intreg sau real (NUMBER)
- valori logice sub forma intreg cu semn astfel: 1 pentru TRUE si 0 sau NULL pentru FALSE
- valori logice sub forma de caracter astfel: prima litera din lista [Y, y, D, d, T, t] pentru TRUE si orice altceva inclusiv NULL pentru FALSE
- (DBS-05) in cazul bazelor de date relationale, integritatile referentiale vor fi evitate la maximum prin intretinerea datelor numai cu ajutorul aplicatiei sau in cazull necesitatii modificarii manuale a datelor, aceasta modfica re sa fie efectuata numai de personal calificat
- (DBS-06) informatiile de tip data-timp (data, ora, etc...) vor fi stocate de preferinta sub forma de String in formatul ISO: YYYY-MM-DD HH:MM:SS.nnnnn.
- (DBS-07) informatii de data-timp vor fi stocate avind valori agnostice de "Time Zone" adica vor fi considerate

 UTC lucru care va permite comparabilitatea acestora indiferent de locatia /zpna de timp de unde au fost
 generate.

22.4 Considerente generale privind auditarea informatiilor

- Cimpurile de audit ce indica utilizatori:
 - (AUD-01) pentru informatiile CONSTIENT GENERATE DE UTILIZATORI (adica generate prin activarea unor controale vizuale, prin lansarea manuala a unei aplicatii, etc), aceste cimpuri vor contine numele tip username al utilizatorului folosit pentru autentificarea in sistem
 - (AUD-02) pentru informatiile GENERATE DE SISTEM la rulari automate, periodice, de verificare, de validare, etc, aceste cimpuri vor contine textul system (pentru a evita confuzii cu utilizatori reali la nivel de sistem de operare)
- (AUD-03) Cimpurile de audit ce indica date calendaristice vor respecta standardul ISO fiind in formatul maximal YYYY-MM-DD hh:mm:ss

INVOICE to RO E-Fact to ACHIEVE Solven Scalen

INVOICEtoROefact System

(c) 2023 RENware Software Systems

23 Propunere tehnica sistem INVOICEtoROefact

Cuprins:

- Propunere tehnica sistem INVOICEtoROefact
 - Objective
 - Vedere de ansamblu a solutiei
 - Componenta xl2roefact
 - Diagrama logica de functionare a componentei
 - Componenta WEB_DASHB
 - Componenta SYSTEM_DB
- p/n: 0000-0095
- code-name: api_to_roefact
- commercial name: INVOICEtoROefact
- url propunere tehnica: http://apitoroefact.renware.eu/commercial_agreement/110-SRE-api_to_roefact_requirements.html
- git: https://github.com/petre-renware/api_to_roefact

Cuprins:

- Propunere tehnica sistem INVOICEtoROefact
 - Objective
 - · Vedere de ansamblu a solutiei
 - · Componenta xl2roefact
 - Diagrama logica de functionare a componentei
 - Componenta WEB_DASHB
 - Componenta SYSTEM_DB

23.1 Objective

Acest sistem va asigura incarcarea facturilor emise in sistemul ANAF E-Factura (https://www.anaf.ro/anaf/internet/ANAF/despre_anaf/strategii_anaf/proiecte_digitalizare/e.factura) cu respectarea reglementarilor publicate in acest sens (lista contine si legaturi catre fisierele publicate de catre ANAF):

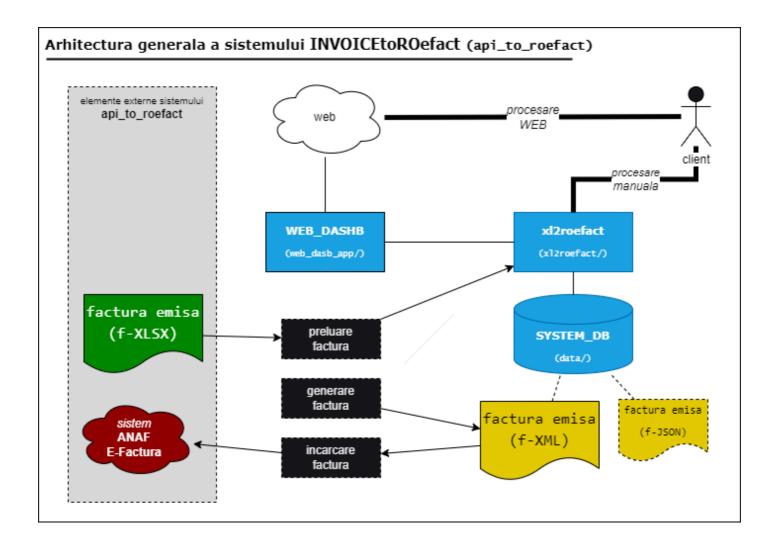
- Conformarea la modificarile legislative si utilizarea sistemului (https://static.anaf.ro/static/10/Anaf/Informatii_R/Informatii_modificare_CIUS_RO.pdf)
- Informatii de interes referitoare la implementarea sistemului național privind factura electronică RO e-Factura (https://static.anaf.ro/static/10/Anaf/Informatii_R/Comunicat_e-factura_aprilie2022_v2_050422.pdf)
- Instrucțiuni de utilizare
 (https://static.anaf.ro/static/10/Anaf/Informatii_R/API/Oauth_procedura_inregistrare_aplicatii_portal_ANAF.
 pdf)

23.2 Vedere de ansamblu a solutiei

Solutia api_to_roefact consta din urmatoarele componente:

- api_to_roefact . x12roefact aceasta componenta are rolul de a implementa efectiv obiectivele principale ale sistemului INVOICEtoROefact. Componenta este capabila sa ruleze atit "standalone" (ca linie de comanda CLI) dar si prin utilizarea ei de catre componenta WEB_DASHB si astfel utilizarea ei in varianta de sistem prezentat "over internet / intranet". Prezentarea detalita a acesteia se gaseste aici.
- api_to_roefact . WEB_DASHB aceasta componenta are rolul de agrega componentele si de a prezenta solutia INVOICEtoROefact "over internet / intranet". De asemenea componenta asigura modulele UI necesare pentru administrarea sistemului. Prezentarea detalita a acesteia se gaseste aici.
- api_to_roefact . SYSTEM_DB .Aceasta componente reprezita baza de date a sistemului INVOICEtoROefact atit partea relationala dar si partea no-sql a acesteia (utilizata pentru eventuale sincrnizari provenite din utilizarea CLI a componentei x12roefact). Prezentarea detalita a acesteia se gaseste aici.

Figura urmatoare prezinta schematic rolul general al componentelor precum si interactiunea acestora cu mediul exterior sistemului api_to_roefact.



23.3 Componenta xl2roefact

- (RDINV) modul de procesare a fisierului format XLSX ce contine factura si colectare a datelor aferente
 - INTRARI: fisier format XLSX ce contine factura emisa (cod: f-XLSX)
 - IESIRI: fisier format JSON imagine a datelor facturii (cod: f-JSON)
- (WRXML) modul de generare a fisierului format XML
 - INTRARI: fisier f-JSON
 - IESIRI: fisier format XML conform cerintelor si sistemului ANAF E-Factura (cod: f-XML)
- (CHKXML) modul de validare a facturii in sistemul ANAF E-Factura
 - INTRARI: fisier f-XML
 - IESIRI: raport cu eventualele erori de validare ¹
- (LDXML) modul de incarcare a facturii in sistemul ANAF E-Factura
 - INTRARI: fisier f-XML
 - IESIRI: raport cu validarea si identificatorul incarcarii 1
- (CHKISLD) modul de verificare a starii de incarcare a unei facturi emise

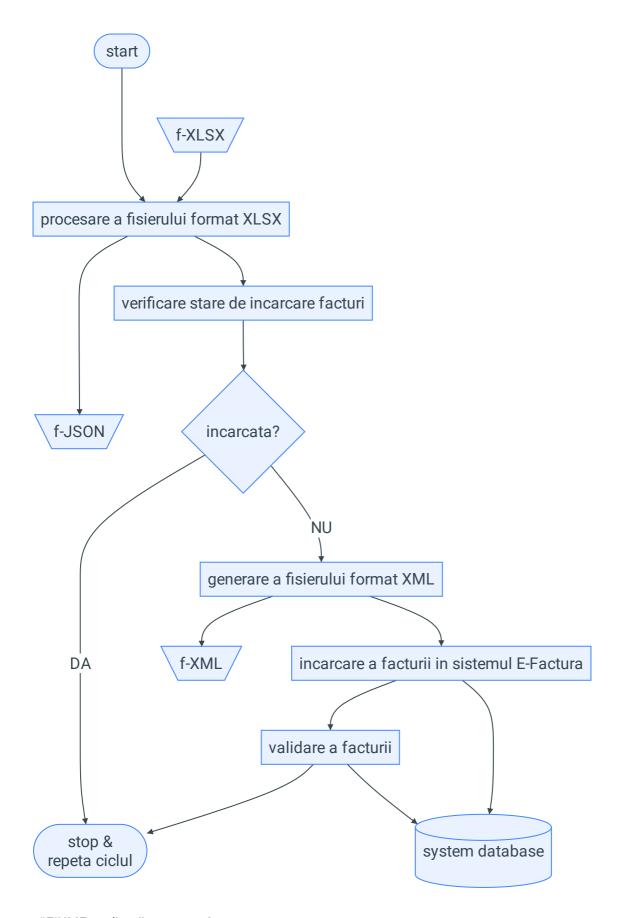
- INTRARI: fisier f-XLSX sau numarul / cheia / codul facturii
- IESIRI: valoarea echivalent TRUE daca factura a fost deja incarcata sau valoare echivalent FALSE daca factura nu a fost incarcata 2



Formatul fisierelor Excel cu factura

XLSX este sigurul format de fisier acceptat

23.3.1 Diagrama logica de functionare a componentei



...#FIXME explicatii necesare?...

23.4 Componenta WEB_DASHB



...INCOMING...

23.5 Componenta SYSTEM_DB



...INCOMING...

- 1. raportul se scrie in baza de date a sistemului si in fisierul f-XLSX intr-un worksheet separat dedicat acestui scop ← ←
- 2. in cazul valorii echivalent TRUE se poate intoarce identificatorul incarcarii daca este disponibil 🗠

RENware Software Systems

24 Propunere tehnica sistem PayValidaBoa

Cuprins:

- · Propunere tehnica sistem PayValidaBoa
 - Objective
 - Vedere de ansamblu a solutiei
 - · Cerinte functionale generale
 - Componenta xxx
- p/n: 0000-0094
- code-name: payments_validation_board
- · commercial name: PayValidaBoa
- url propunere tehnica: http://apitoroefact.renware.eu/commercial_agreement/110-SRE-payments_validation_board_req.uirements.html
- git: n/a

Cuprins:

- · Propunere tehnica sistem PayValidaBoa
 - Objective
 - Vedere de ansamblu a solutiei
 - · Cerinte functionale generale
 - Componenta xxx

24.1 Objective

Acest sistem asigura prezentarea unui "dashboard" cu lista facturilor primite si starea lor de **verificare si aprobare interna** in vederea ordonantarii lor la plata.

24.2 Vedere de ansamblu a solutiei

Sistemul payments_validation_board consta din urmatoarele componente:

• INV_TOPMNG_BOARD - aceasta componenta prezinta pentru MANAGEMNTul tip CFO lista facturilor primite si starea lor referitor la validarea si aprobarea lor finala si un control pentru APROBARE FINALA sau BUN DE PATA.

- INV_CHK_BOARD aceasta componenta prezinta pentru VERIFICATORI si APROBABTORI lista fa/turilor primite si diverse controale pentru aprobarea si scrierea de diverse note si observatii.
- INV_NOTIF_BOARD aceasta componenta prezinta notificari referitoare la diversele OBSERVATII si NOTE facture asupra facturilor primite in diverse stadii de aprobare de catre persoanele care efectueaza verificari asupra lor (prin componenta INV_CHK). Notificarile sunt disponibile atit in interfata aplicatiei iar unele din ele pot fi transmise prin mail.
- INV_LD_FOR_APPRV aceasta componenta permite incarcarea facturilor in fluxul de aprobare. Optiuni de incarcare:
 - manuala (dintr-un board al aplicatiei)
 - · automata dintr-un director
 - dintr-o baza de date externa sistemului (cu "marcarea" facturilor ce vor trebui incarcate)
 - la incarcare (indiferent de metoda) vor trebui specificati (sau dedusi din alte informatii) DESTINATARII ce primesc documentul
- ADMIN_CFG aceasta componenta permite pentru ADMINISTRATORI diverse OPTIUNI DE CONFIGURARE:
 - lista utilizatorilor ce fac parte dinfluxul de aprobare
 - adresele e-mail ale utilizatorilor
 - rolul utilizatorilor in accea ce priveste fluxul de aprobare facturile primite
 - certificate si semnaturile de certificare a "semnaturilor" de aprobare
 - ...

Figura urmatoare prezinta schematic rolul general al componentelor precum si interactiunea acestora cu mediul exterior sistemului payments_validation_board.



...IN PROGRESS...

24.3 Cerinte functionale generale



...INCOMING...

24.4 Componenta xxx



...INCOMING...

RENware Software Systems

25 Optiuni tehnice

Cuprins:

- · Optiuni tehnice
 - · Optiuni sistem INVOICEtoROefact
 - Recomandari sistem INVOICEtoROefact
 - · Optiuni sistem PayValidaBoa
 - Optiuni generale de implementare

Acest document prezinta posibilele optiuni tehnice la cele doua sisteme, optiuni care vor trebui agreate si (preferabil) planificate cel putin din punct de vedere al prioritatii.

25.1 Optiuni sistem INVOICEtoROefact

Forma de utilizare si interactionare

- 🗆 (INVOICEtoROefact-RQ-01) varianta CLI (command line) cu utilizare "individuala"
- 🗆 (INVOICEtoROefact-RQ-02) varianta WEB cu utilizare centralizata

Configurabilitate

- [INVOICEtoROefact-RQ-03] varianta in care se prelucreaza un model de fisier Excel in care sunt "fixate si blocate" locatiile celulelor ce contin date relevante
- [INVOICEtoROefact-RQ-04] varianta in care structura si formatul fisierului Excel contin "cuvinte cheie" ce determina regasirea date relevante (de exemplu textul "Client:" intr-o celula semnifica inceperea unei zone cu datele clientului de la acea celula in jos si pina prima celula necompletata ce va fi gasita)

25.1.1 Recomandari sistem INVOICEtoROefact

- varianta (INVOICEtoROefact-RQ-01) este recomandata ca fiind "aproape obligatorie" deoarece chiar si in varianta WEB ea va trebui scrisa intr-o forma neutilizabila direct (sub forma de functie a sistemlui).
 Transformarea acestei functii in varianta CLI va permite o executie portabila ("la purtator") si offline (in situatii extreme se poate folosi doar fisierul XML generat si acesta va putea fi manual incarcat in ANAF-SPV).
 Informatia privind "starea de incarcare a facturii" va fi oricum salvata si in fisierul Excel aferent facturii si va putea fi preluata de catre varianta WEB pentru centralizarea informatiilor- a se vedea si modulul LDXML si notele de subsol aferente
- optiunea (INVOICEtoROefact-RQ-03) este recomandata ca varianta de start deoarece va permite realizarea unei variante OPERATIONALE (de lucru curent si testare) intr-un termen mai scurt, urmind ca aceasta optiune sa fie gradat extinsa si cu optiunea (INVOICEtoROefact-RQ-04). Aceasta "linie de lucru" nu va induce probleme, avind in vedere ca orice optiune / varianta aleasa ca varianta de start si planificata a fi extinsa va implica si MIGRAREA datelor deja produse la momentul extinderii ei

25.2 Optiuni sistem PayValidaBoa

Д

Framework standardizat de orchestrare

- 🗆 (PayValidaBoa-RQ-01) utilizarea unui framework specializat de orchestrare si integrare cu alte sisteme "externe"
 - Implicatii: poate mari durata de implementare
 - Avantaje: utilizarea ulterioara pentru integrare intre sisteme ce prezita interfata standardizata (REST, SOA, NTFS, EXT4, OAuth, ...)

Д

Semnare electronica a facturilor verificate

- (PayValidaBoa-RQ-02) utilizarea de certificat tip "semnatura electronica" pentru autentificarea verificarii facturilor EMBEDDED IN FACTURA
- (PayValidaBoa-RQ-03) utilizarea de certificat tip "semnatura electronica" pentru autentificarea verificarii facturilor adiacet facturii disponibil pentru consultare numai in sistemul PayValidaBoa
- (PayValidaBoa-RQ-04) verificarea facturilor nu necesita certificat tip "semnatura electronica" ci simpla informatie existenta in sistemul PayValidaBoa este suficienta



Baza de date 'interna / specifica' sistemului PayValidaBoa

• a se vedea documentul "Considerente tehnice generale", sectiunea "Considerente generale privind bazele de date proprii sistemelor", item "(DBS-03)" pentru opptiuni privind baza de date ce va fi utilizata "pentru operatiuni interne si specifice" de catre sistemul PayValidaBoa

25.3 Optiuni generale de implementare

Sistemele tip infrastructura ce vor fi utilizate
• (general-RQ-01) - server web-HTTP pentru aplicatiile de tip WEB (ATENTIE: sistemele WEB ce vor fi implementate necesita interfata / mod de operare standard WSGI)
• 🗆 (general-RQ-02) - sistem de autentificare utilizat (intern aplicatie, Google, Identity Management propriu,)
• 🗆 (general-RQ-03) - sistemele vor rula pe infrastructura proprie sau aceastea vor rula in infrastructuri gazduite
Alte optiuni 'ad-hoc' (in sedinta)
•
•
•
•
•

RENware Software Systems



Versiunile development

Versiunile ce contin in codul / numarul lor acronimul dev sunt considerate versiuni elaborate in faza de dezvoltare software. Aceste versiuni sunt functionale cu singura observatie ca testele facute sunt doar din punct de vedeare a codului si nu cu date de business, adica nu prezinta erori in functionare. Se recomanda a folosi aceste versiuni in cazurile de dezvoltari proprii sau integrari cu alte sisteme.

26 Descarcare resurse (downloads)

26.1 Format sursa biblioteca Python

26.1.1 xl2roefact pe PyPi

Versiunea de pe pe repository-ul public PyPi permite instalarea directa in mediul Python local astfel:

pip install xl2roefact

In acest mod va fi instalata automat ultima versiune publicata pe *PyPi* (https://pypi.org/project/xl2roefact/) . Accesati linkul anterior pentru a putea accesa alte versiuni publicate pe *PyPi* si modul de instalare a acestora.

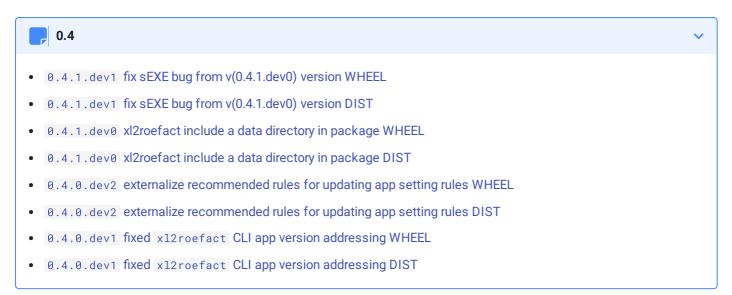
26.1.2 xl2roefact pachete redistribuibile



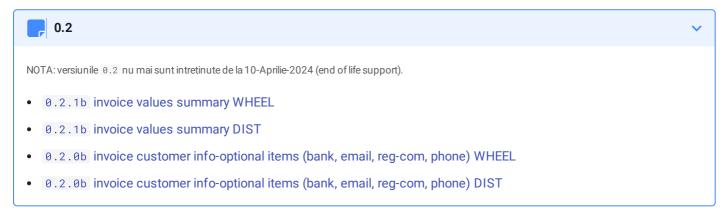
0.5

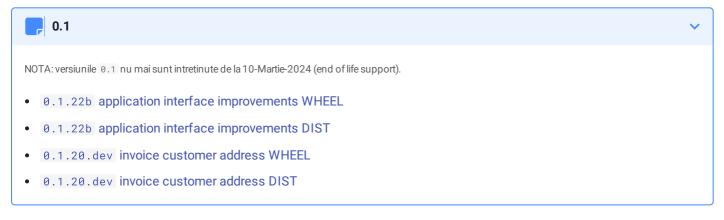


- 0.5.3rc1 fix invoice JSON key "cac:Party" naming DIST
- 0.5.3rc0 invoice supplier from Excel WHEEL
- 0.5.3rc0 invoice supplier from Excel DIST







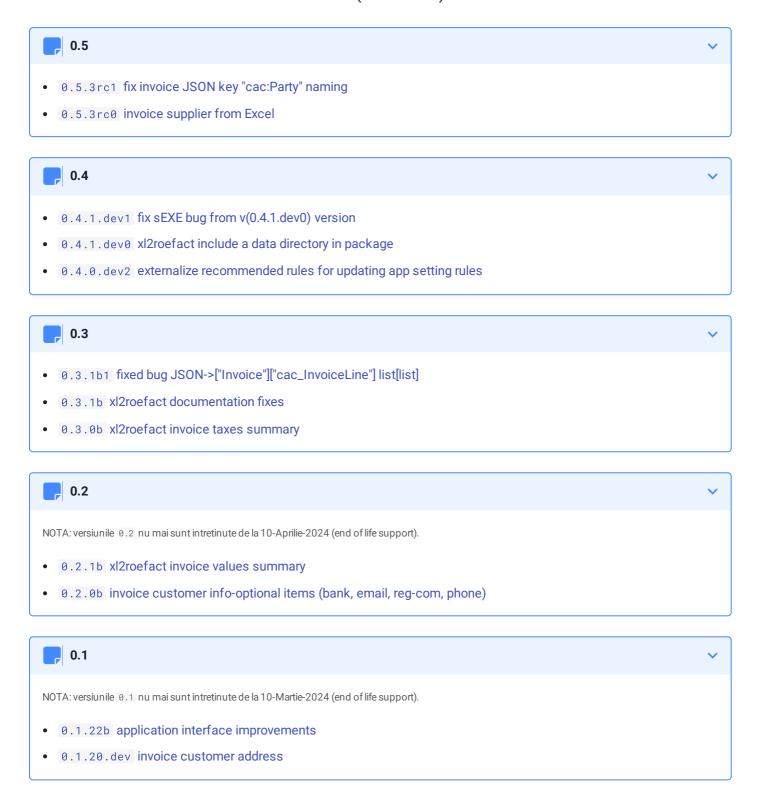


26.1.3 web2roefact pe PyPi

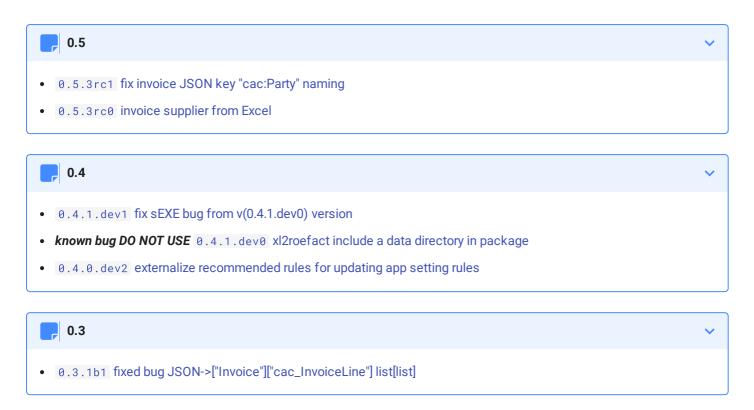
Nici o resursa disponibila.

26.2 Windows x64

26.2.1 xl2roefact linie comanda kit instalare (win64-msi)



26.2.2 xl2roefact linie comanda executabil portabil (win64-exe)



26.2.3 web2roefact kit instalare (win64-msi)

Nici o resursa disponibila.

26.3 Linux

Nici o resursa disponibila.

26.4 MacOS X

Nici o resursa disponibila.

26.5 Sablon template factura



26.6 Sablon fisier configurare a aplicatiei xl2roefact

Sablonul permite configurarea aplicatiei prin modificarea fragmentelor de text care trebuiesc cautate in fisierul Excel pentru identificarea diverselor informatii aferente facturii.

Sablonul este in format YAML (https://yaml.org/) iar informatiile ce trebuiesc descrise sunt explicate individual in comentarii insotitoare. De asemenea este util a fi citite si recomandarile date in pagina de descriere a aplicatiei.

Pentru a beneficia de cobfigurarile facute de dumneavoastra trebuie sa creati un fisier app_settings.yml in directorul curent din care lansati aplicatia, fisier ce contine noile configurari dorite. Numele fisierelui este obligatoriu a fi respectat.



Fisiere de configurare multiple

De retinut ca acest fisier este considerat (daca exista) cel din directorul curent de unde lansati aplicatia. Deci daca v-ati creat mai multe directoare de lucru (de exemplu pentru clienti diferiti) puteti crea fisiere de configurare specifice, cite unul in fiecare director.



Sablon de fisier

Urmarind acest link puteti descarca un sablon de fisier de configurare. De mentionat ca acest sablon este pre-completat cu situatii deja intilnite in practica, el fiind chiar sablonul implicit folosit de aplicatie.

26.7 Sablon fisier cu date furnizor

Descarcare aici.

VII. About

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```
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VII.I Despre INVOICEtoROefact

RENware Software Systems

INVOICEtoROeFact Project

- CHANGELOG
 - 0.5
 - 0.5.4.dev0 #NOTE-(temporary.dev.version.up.to.finishing.it) invoice supplier from owner master data (#TODO: ... in progress...)
- Archived CHANGELOGs
 - 0.5 version
 - 0.4 version
 - 0.3 version
 - 0.2 version
 - 0.1 version

27 CHANGELOG

- For version code structure meaning see SDEVEN methodology document (http://sdeven.renware.eu)
- <PROJECT_ROOT>/doc_src/ is the default starting location in a file path (if not clear from context) (ATTN in production environment is docs/)
- <WEB_ROOT>/ is the HTTP server root directory, as default docs/ and supposed if no other parent is specified

27.1 0.5

27.1.1 0.5.4.dev0 #NOTE-(temporary.dev.version.up.to.finishing.it) invoice supplier from owner master data (#TODO: ... in progress...)

- tbd.Must... this release should go to master branch being pure release
- tbd.Must... update downloads.md
- · tbd.Must... build all beliverables
- tbd.Must... change this head to 0.5.4 version, update all /versions.yml and assure that all are published
- owner-dbs-file get OWNER EXTERNAL DATA feature (version 0.5.4.dev0+owner-dbs-file):
 - ✓ 1. create data/owner.yml structure to exactly what is needed for actual JSON "Invoice..." key
 - 2. created a skeleton for hier_get_data_file() module, update its docstring and generate DLD documentation
 - ✓ 3. set a new flag for x12json command for getting owner from ext data-file: --owner -o [FILE] where
 FILE being defaulted to ./owner.yml or hierarchy to data/owner.yml

- 4. app_cli.py chk if file is ok and sent it as correct Path if, else raise an err msg and continue from Excel
- 5. code. Get owner data by using function hier_get_data_file()
- 6. update owner.yml file and add bank information
- 7. code. Get owner bank information from external data file
- 8. build xl2roefact DLD documentation
- 9. code. Review "place where called for OWNER info", clean, update and close code
- 10. make template for owner data file (owner_datafile_tmeplate.yml) and prep it with built-in documentation hints
- ✓ 11. updated temporary all version to 0.5.4.dev0 to make DEV publishes (basically for site, but other tests are possibile)
- ✓ 12. add xl2roefact README doc with section "Utilizare nomenclator de furnizori"
- ✓ 13. build site and publish as site version 0.5.4.dev0 (temporary value)
- hier-get-data-file func to select hierarchical a file from ./ or data/ (in libutils module):
 - 1. create skeleton hier_get_data_file(file_name: str) -> Path in x12roefact.libutils module
 - 2. code function to solve actual functional case from x12roefact.config_settings module
 - 3. update x12roefact.config_settings module to use the new function

28 Archived CHANGELOGs



28.1 0.5 version

- 0.5.3rc1 fix invoice JSON key "cac:Party" naming
- 0.5.3rc0 invoice supplier from Excel
- 0.5.2.dev2 release xl2roefact. 0.4.1.dev1 fix sEXE bug from 0.4.1.dev0 version
- 0.5.1.dev1 site readability improvements



28.2 0.4 version

- 0.4.1.dev0 xl2roefact include a data directory in package for various data files "built-in" package
- 0.4.0.dev2 externalize recommended rules for updating app setting rules



28.3 0.3 version

- 0.3.2b0 single EXE version
- 0.3.1b1 fixed bug JSON->["Invoice"]["cac_InvoiceLine"] list[list]
- 0.3.1b promote v0.3.0b0 deliverables: WHEEL, TRA.GZ, MSI to 0.3.1b
- 0.3.0b xl2roefact invoice taxes summary



28.4 0.2 version

- 0.2.2.dev project development environment improvements
- 0.2.1b invoice grand totals
- 0.2.0b xl2roefact invoice customer info-optional items (bank, email, reg-com, phone)



28.5 0.1 version

- 0.1.22b xl2roefact application interface improvements
- 0.1.21.post3 cleaned system documentation and site
- 0.1.21.post2 xl2roefact app detailed section with commands & options "--help" like
- 0.1.21.post1 fixed missing links in site root index page
- 0.1.21 rollout news in system portal invoicetoroefact.renware.eu
- 0.1.20.dev invoice customer address
- 0.1.19.dev invoice customer and partial invoice total values calculations
- 0.1.18.dev invoice customer CUI partial invoice total values calculations
- 0.1.17.dev fixed all application & package running standard ways
- 0.1.16.dev improving Excel kv-data search with "IN-LABEL" method
- 0.1.15 updated solution portal http://invoicetoroefact.renware.eu/
- 0.1.14.dev invoice issue date
- 0.1.13.dev invoice currency
- 0.1.12.dev invoice number
- 0.1.11.dev packaging improvements for app & xl2roefact package
- 0.1.10.dev command interface improved, msi package building, invoice template & updated documentation
- 0.1.9.dev x12roefact.RDINV running executable and distribution kit
- 0.1.8.dev improved application structure and first executable release
- 0.1.7.dev x12roefact.RDINV invoice items & metadata + OPEN ISSUES
- 0.1.6.dev commercial agreement OPTIONS document
- 0.1.5.dev init component xl2roefact for CLI application
- 0.1.4.dev Create system backbone structure
- 0.1.3.dev Enhancing payments_validation_board technical proposal
- 0.1.2.dev Enhancing APItoROefact technical proposal
- 0.1.1.dev Elaborating technical proposal
- 0.1.0.dev System raw backbone