

Confero Technologies, SIA
Registration No.: 40203176720
23 Elizabetes St., Riga, LV-1010, Latvia

Tel.: +371 6777 5111
info@confero.tech
www.confero.tech



Open Banking

PSD2 compliant
open banking solution

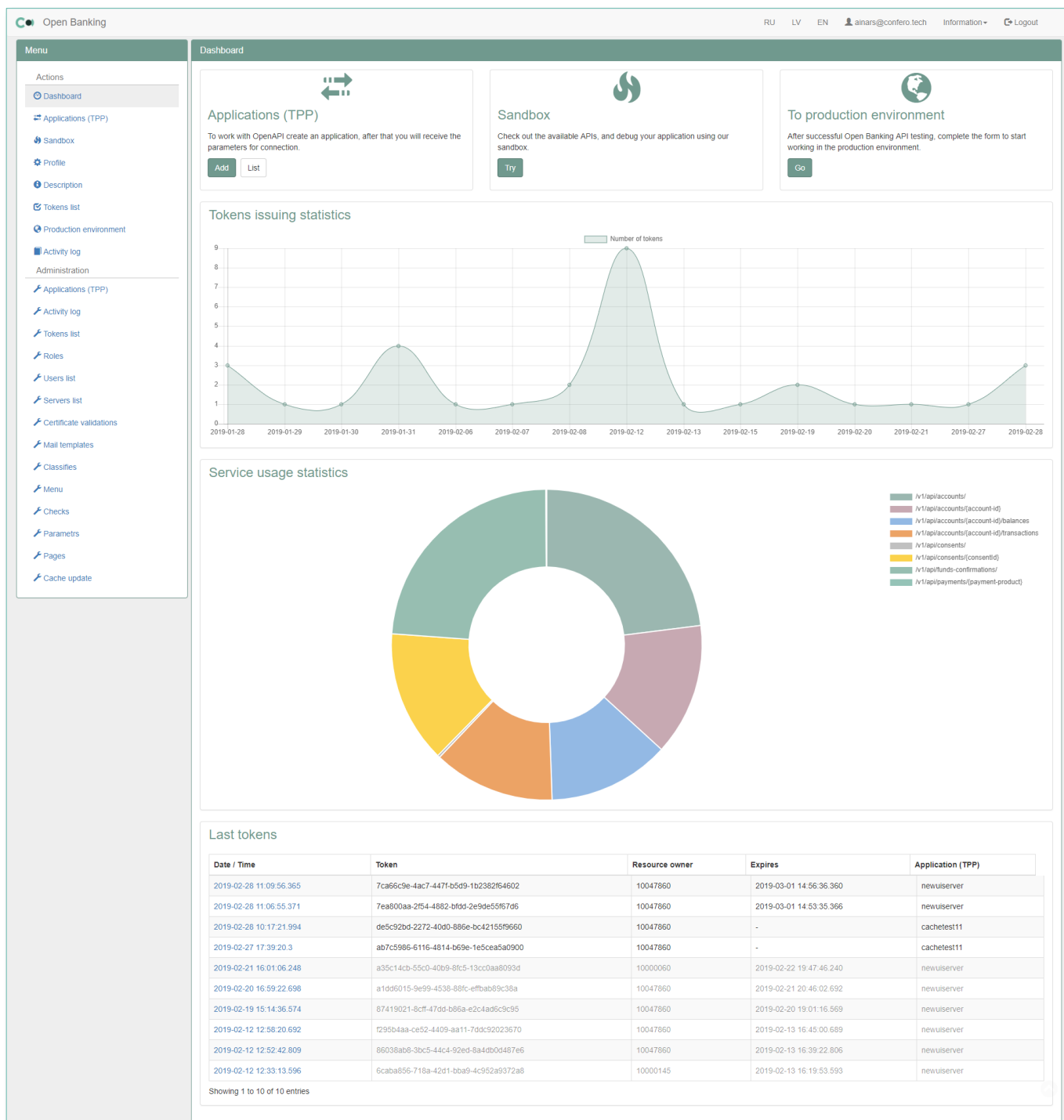
Overview as at June 2020





The Confero Open Banking System provides the XS2A (access to account) access interfaces (APIs) for the PSD2 regulation, based on the Account Servicing Payment Service Provider (ASPPS). The XS2A interfaces of the Confero Open Banking system are implemented according to any standard of the client, for example, the specification "Joint Initiative on a PSD2 Compliant XS2A Interface NextGenPSD2 XS2A Framework Implementation Guidelines" 1.3. (www.berlin-group.org).

The system provides basic interfaces (PSD2 Core Services), which are mandatory under PSD2 regulation.





PSD2 Core Services

The system out-of-the-box provides base interfaces (PSD2 Core Services), which are mandatory according to the PSD2 regulations:

- Account information services - a set of services that allow third-party service providers to access customer accounts, balances, and transactions with customer consent.
- Payment initiation services - a set of services that allow third-party service providers to initiate a payment on behalf of a client. There are also services available for checking the payment status and obtaining payment information. PSD2 states that all electronic transactions must be strictly authenticated by customers, so after initiating a payment, the customer authorizes the payment with the ASPSP authorization tool.
- Confirmation of funds service - a service that allows you to check whether a given amount of money is available in a particular account.

Easy to develop and test new services.

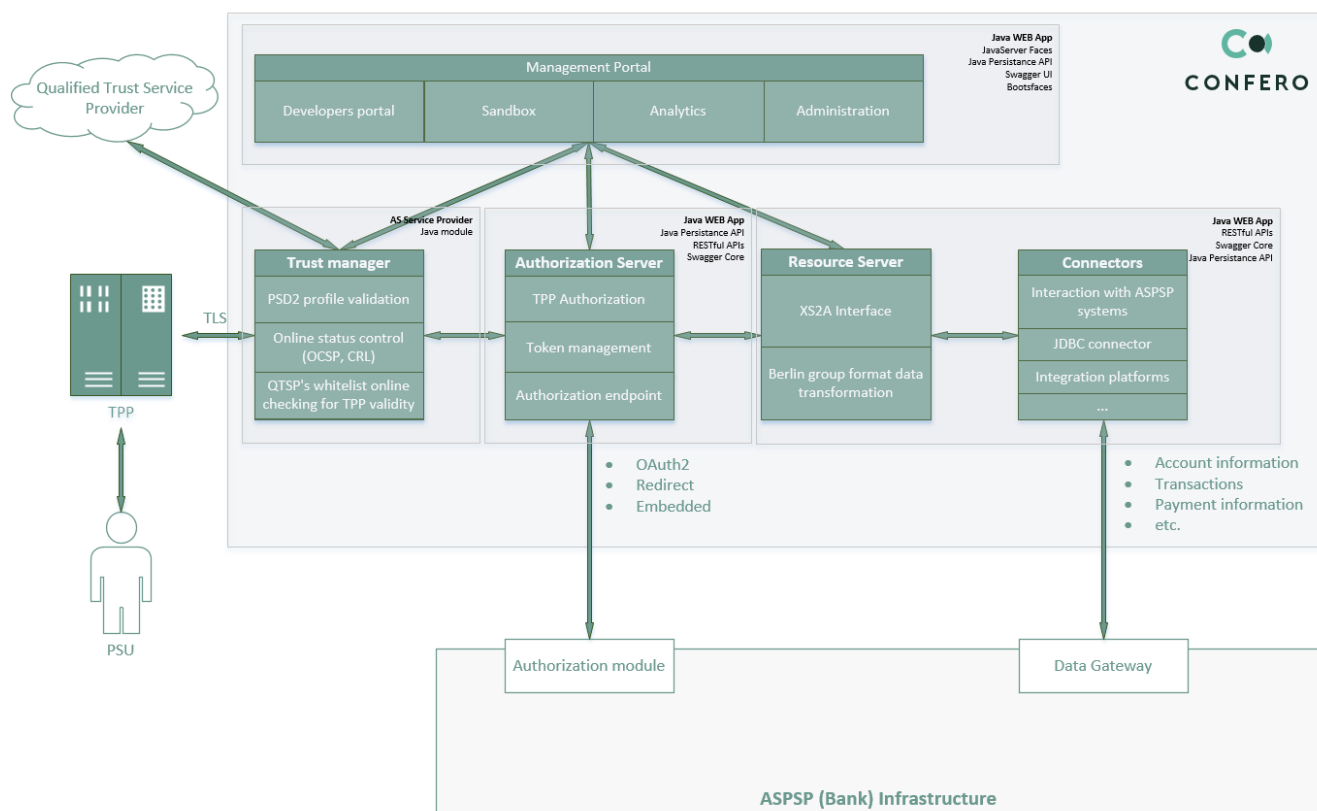
The screenshot displays the 'Open Banking' API management interface. The top navigation bar includes the language selector (RU, LV, EN), the user profile (Aleksandr@confero.tech), and a Logout button. The left sidebar contains a 'Menu' with various navigation options such as Dashboard, Applications (TPP), Sandbox, Profile, Description, Tokens list, Production environment, Activity log, and Administration. The main content area is titled 'Sandbox' and features an 'Authorization data' section with fields for Application (TPP), Key, and Secret. Below this is an 'Authorize' button. The interface lists several API endpoints categorized into Accounts, Consents, FundsConfirmation, and Payments, each with its HTTP method, endpoint path, and a brief description. A 'DELETE' button is highlighted for the endpoint `/v1/api/consents/{consentId}`.

Method	Endpoint	Description
GET	<code>/v1/api/accounts</code>	Reads a list of bank accounts, with balances where required.
GET	<code>/v1/api/accounts/{account-id}/balances</code>	Give detailed balance information about the addressed account.
GET	<code>/v1/api/accounts/{account-id}</code>	Reads details about an account, with balances where required.
GET	<code>/v1/api/accounts/{account-id}/transactions</code>	Read transaction reports or transaction lists of a given account.
GET	<code>/v1/api/consents/{consentId}/authorisations/{authorisationId}</code>	Read the SCA status of the authorisation.
POST	<code>/v1/api/consents/{consentId}/authorisations/{authorisationId}</code>	Create an authorisation sub-resource and start the authorisation process.
GET	<code>/v1/api/consents/{consentId}</code>	Returns the content of an account information consent object.
DELETE	<code>/v1/api/consents/{consentId}</code>	Terminate the addressed consent.
POST	<code>/v1/api/consents</code>	Creates an account information consent resource at the ASPSP regarding access to accounts specified in this request.
GET	<code>/v1/api/consents/{consentId}/status</code>	Read the consent status of the addressed consent resource.
POST	<code>/v1/api/funds-confirmations</code>	Creates a confirmation of funds request at the ASPSP.
POST	<code>/v1/api/payments/{payment-product}</code>	Creates a payment initiation request at the ASPSP.

Flexible architecture

The Open Banking system consists of four modules:

- Trust Manager.
- Authorization Server.
- Resource Server.
- Customer and Administration Portal.





Trust Manager

Trust Manager is a module that validates third-party certificates at the transport level:

- Checks the validity of the certificate.
- Verifies the certificate chain.
- Provides support for OCSP (Certificate of Online Certificate Status) and CRL (Certificate Revocation List).
- Checks the certificate to the Qualified Trust Service Provider (QTSP).
- Extracts roles and other information about third-party service providers from the certificate extension.

Certificate validations

Date / Time	Validation result	TPP code
2019-02-25 19:23:47.307	VALID	PSDES-BDE-3DFD21
2019-02-25 19:22:15.493	VALID	PSDES-BDE-3DFD21
2019-02-25 19:21:28.715	VALID	PSDES-BDE-3DFD21
2019-02-25 19:18:31.403	VALID	PSDES-BDE-3DFD21
2019-02-25 19:18:13.432	VALID	PSDES-BDE-3DFD21
2019-02-25 19:10:10.652	VALID	PSDES-BDE-3DFD21
2019-02-25 19:05:33.221	VALID	PSDES-BDE-3DFD21
2019-02-25 19:02:52.791	VALID	PSDES-BDE-3DFD21
2019-02-25 18:50:10.529	VALID	PSDES-BDE-3DFD21
2019-02-25 14:01:20.579	VALID	PSDES-BDE-3DFD21
2019-02-25 13:58:06.469	VALID	PSDES-BDE-3DFD21
2019-02-25 13:58:01.064	INVALID	PSDES-BDE-3DFD21
2019-02-25 13:56:35.154	VALID	PSDES-BDE-3DFD21
2019-02-25 13:52:05.152	VALID	PSDES-BDE-3DFD21
2019-02-25 13:48:16.435	VALID	PSDES-BDE-3DFD21
2019-02-25 13:38:06.742	VALID	PSDES-BDE-3DFD21
2019-02-25 13:36:59.04	VALID	PSDES-BDE-3DFD21
2019-02-25 13:31:17.976	VALID	PSDES-BDE-3DFD21
2019-02-25 13:24:40.902	VALID	PSDES-BDE-3DFD21
2019-02-25 13:24:32.125	INVALID	PSDES-BDE-3DFD21
2019-02-25 13:23:31.442	VALID	PSDES-BDE-3DFD21
2019-02-25 13:14:42.539	VALID	PSDES-BDE-3DFD21
2019-02-25 13:12:42.906	VALID	PSDES-BDE-3DFD21
2019-02-25 13:09:21.411	VALID	PSDES-BDE-3DFD21
2019-02-25 13:07:43.269	VALID	PSDES-BDE-3DFD21

Entries: 1 - 25 of 230, page: 1/10

Certificate serial number

0374695d0e730775c1e260c8a246c809f3c4

Validations

Date / Time	Type	Result
2019-02-25 13:58:01.077	CHAIN	VALID
2019-02-25 13:58:01.077	APP	VALID
2019-02-25 13:58:01.09	OCSP	VALID
2019-02-25 13:58:01.181	CRL	UNKNOWN

SSL information

Enabled Protocols

[TLsv1.2]



Authorization Server

Authorization Server is intended for authorization of third-party providers and end users:

- Connects to the ASPSP system to authorize end users and payments, and confirm the authority to perform actions.
- Based on the results of the end-user authorization, it generates new access tokens, which include user rights description parameters.
- Validates each third-party service provider request according to the access token parameters.
- Stores and audits all actions performed on access tokens.

Tokens list					
Date / Time	Token	Resource owner	Expires	Application (TPP)	
2019-02-27 17:39:20.3	ab7c5986-6116-4814-b69e-1e5cea5a0900	10047860	-	cachetest11	Remove
2019-02-21 16:01:06.248	a35c14cb-55c0-40b9-8fc5-13cc0aa8093d	10000060	2019-02-22 19:47:46.240	newuiserver	Remove
2019-02-20 16:59:22.698	a1dd6015-9e99-4538-88fc-efbab89c38a	10047860	2019-02-21 20:46:02.692	newuiserver	Remove
2019-02-19 15:14:36.574	87419021-8cff-47dd-b86a-e2c4ad6c9c95	10047860	2019-02-20 19:01:16.569	newuiserver	Remove
2019-02-12 12:58:20.692	f295b4aa-ce52-4409-aa11-7ddc92023670	10047860	2019-02-13 16:45:00.689	newuiserver	Remove
2019-02-12 12:52:42.809	86038ab8-3bc5-44c4-92ed-8a4db0d487e6	10047860	2019-02-13 16:39:22.806	newuiserver	Remove
2019-02-12 12:33:13.596	6caba856-718a-42d1-bba9-4c952a9372a8	10000145			
2019-02-08 12:00:19.456	53e12169-29b9-414c-853c-325f376d81e8	10047860			
2019-02-07 09:23:00.827	a01ba899-5413-48c8-9905-22496572519e	10047860			
2019-02-06 15:42:39.474	ffa5bbf1-e7ee-4d03-887d-7af037452e48	10047860			
2019-01-31 13:51:30.648	dee90423-1d44-4017-8d4a-0f58486d8041	10047860			
2019-01-31 09:14:37.561	055b1c29-df86-401e-a811-d9c2d3dd82b7	10047860			
2019-01-31 09:14:14.238	389a7036-4980-4908-a073-51a803c1ac29	10047860			
2019-01-30 09:29:21.878	6942920b-693b-49a3-9bb2-8c730dc38d7e	10047860			
2019-01-29 09:28:16.554	ea711697-1492-4c68-91e2-943d5a36d492	10047860			
2019-01-28 16:51:48.65	7a2260f7-147a-4946-8736-3fb1323ce234	10047860			
2019-01-28 15:22:29.095	01cf5895-0791-403a-8bd9-3c77cc9c8712	10047860			
2019-01-25 18:12:42.61	d4aa06f8-d8db-403f-8f76-bafd4afae73c	10047860			
2019-01-25 18:04:43.331	8e0368d5-e49f-4b59-9416-7de2ef2a37c6	10047860			
2019-01-25 17:39:56.735	d2c1e2b7-e152-4826-be92-def689410859	10047860			
2019-01-25 17:39:29.631	9aad2336-f684-48a3-9ad5-2e72f1531b4a	10047860			
2019-01-25 17:37:43.525	db3e328f-7ca9-4cf6-93e3-564acf2fe0ab	10047860			
2019-01-25 17:36:58.914	70b84324-9f9e-4ad9-abc4-f4014b733b44	10047860			
2019-01-25 17:36:33.135	fdcbc1e4-1356-42ca-99c4-65f665505abb	10047860			
2019-01-25 17:36:10.002	5a479029-e9a0-40be-8d96-a0b67ec2952c	10047860			

Usage			
ID	Date / Time	Request ID	URL
35	2019-02-27 16:46:10.04	341355.033218861	/v1/api/accounts
32	2019-02-25 12:50:50.779	636792.991496623	/v1/api/accounts
993	2019-02-19 15:19:44.841	649633.563123643	/v1/api/accounts
991	2019-02-19 14:28:47.947	633865.837939084	/v1/api/accounts
990	2019-02-19 14:28:07.256	102425.565477461	/v1/api/accounts
989	2019-02-19 14:19:15.393	544528.568629175	/v1/api/accounts
987	2019-02-19 11:16:48.373	303602.156694978	/v1/api/accounts
986	2019-02-19 11:16:11.262	977087.397128344	/v1/api/accounts
984	2019-02-18 11:12:14.134	403051.701840013	/v1/api/accounts/LV58CONF0000080390007EUR
983	2019-02-15 16:43:16.489	292498.013470322	/v1/api/accounts/LV58CONF0000080390007EUR
982	2019-02-15 16:43:15.124	73776.6693346202	/v1/api/accounts
981	2019-02-15 16:43:14.615	393338.590394706	/v1/api/accounts/LV58CONF0000080390007EUR
980	2019-02-15 16:43:13.203	130260.922480375	/v1/api/accounts
979	2019-02-15 16:43:12.645	177174.414042383	/v1/api/accounts/LV58CONF0000080390007EUR
978	2019-02-15 16:43:10.818	175484.371837229	/v1/api/accounts
977	2019-02-15 16:43:10.246	504562.041722238	/v1/api/accounts/LV58CONF0000080390007EUR
976	2019-02-15 16:43:08.415	926569.222472608	/v1/api/accounts
975	2019-02-15 16:43:07.804	269353.155046701	/v1/api/accounts/LV58CONF0000080390007EUR
974	2019-02-15 16:43:05.518	695793.270133436	/v1/api/accounts
973	2019-02-15 16:43:04.51	858364.975545555	/v1/api/accounts/LV58CONF0000080390007EUR



Resource Server

Resource Server – the module that contains XS2A interfaces:

- Transforms data from Berlin Group specifications' format to ASPSP data format and vice versa.
- Audits all third party service providers' requests and responses to them.
- Contains connectors for work with ASPSP systems in order to obtain information on accounts, balances, transactions, payment information etc.

GET /v1/api/accounts/{account-id}/transactions Read transaction reports or transaction lists of a given account.

Read transaction reports or transaction lists of a given account. For a given account, additional parameters are e.g. the attributes "dateFrom" and "dateTo". The ASPSP might add balance information, if transaction lists without balances are not supported.

Parameters Cancel

Name	Description
account-id * required string (path)	Addressed account reference
X-Request-ID * required string (header)	ID of the request, unique to the call, as determined by the initiating party.
Authorization * required string (header)	Is contained only, if an OAuth2 based authentication was performed in a pre-step or an
Consent-ID * required string (header)	This then contains the consentId of the related AIS consent, which was performed prior
dateFrom * required string (query)	Starting date (inclusive the date dateFrom) of the transaction list. Date format ISODate
dateTo * required string (query)	End date (inclusive the data dateTo) of the transaction list. Date format ISODate
bookingStatus * required string (query)	Permitted codes are "booked", "pending" and "both". Only "booked" is supported, otherw
withBalance string (query)	If contained, this function reads the list of accessible payment accounts including the bo might be ignored by the ASPSP.

Code **Details**

200

Response body

```
{
  "entryReference": "SCTRSC1611700189",
  "endToEndId": null,
  "mandateId": null,
  "checkId": null,
  "creditorId": null,
  "bookingDate": "2016-04-26",
  "valueDate": "2016-04-26",
  "transactionAmount": {
    "currency": "EUR",
    "amount": "-494065.00"
  },
  "exchangeRate": null,
  "creditorName": null,
  "creditorAccount": null,
  "ultimateCreditor": null,
  "debtorName": "ANNA BÉRZINA",
  "debtorAccount": "LV94CONF0000420900002EUR",
  "ultimateDebtor": null,
  "remittanceInformationUnstructured": "1000, CFEUCCA - CF-EURO CASH C ACC, BE",
  "remittanceInformationStructured": "SCTRSC1611700189",
  "purposeCode": null,
  "bankTransactionCode": "98574AR5",
  "proprietaryBankTransactionCode": "601"
}
```

Response headers

```
connection: keep-alive
content-type: application/json
date: Wed, 27 Feb 2019 15:41:43 GMT
transfer-encoding: chunked
```

Customer portal

- Registration of third party service providers and applications.
- Two factor authentication for logging in to the registered account.
- Sandbox – application developing tool that allows login to the ASPSP system and executing available services during development and testing.
- Reporting tools – opportunity to analyze requests in different dimensions.
- Request for transition to production environment.
- The list and administration of issued access tokens.
- Audit records.

The image displays two overlapping screenshots of the CONFERO customer portal. The background screenshot shows the main login page with the CONFERO logo and input fields for E-mail and Password. The foreground screenshot shows the 'Application (TPP)' registration form with the following fields:

Field	Value
Name	Test Application
Description	Account aggregation application
Contact name	Ainars
Contact email	ainars@confero.tech
Token expiration time	30
Redirect URL	http://confero.tech
TPP code	PSDLU25469
Status	Active
Scopes	<input type="checkbox"/> ASPSP <input type="checkbox"/> PISP <input type="checkbox"/> PIISP <input checked="" type="checkbox"/> AISP

A 'Save' button is located at the bottom of the application form.



Administration module

- Administration of third party service providers' applications.
- Audit log containing information regarding users activity.
- Access tokens and consents management tools.
- API calls audit.
- Portal users' and their roles administration.
- Resource server administration.
- Third party service providers' certificate validations audit log
- Administration of the portal.

Activity log

Date / Time	E-mail	Event	Description
2019-02-27 18:19:58.362	ainars@confero.tech	Page view	User opened page: Activity log
2019-02-27 18:19:29.394	ainars@confero.tech	Page view	User opened page: Activity log
2019-02-27 18:19:25.53	ainars@confero.tech	Page view	User opened page: Applications (TPP)
2019-02-27 18:12:54.288	ainars@confero.tech	Page view	User opened page: Application (TPP)
2019-02-27 18:12:51.65	ainars@confero.tech	Page view	User opened page: Applications (TPP)
2019-02-27 18:12:47.907	ainars@confero.tech	Page view	User opened page: Dashboard
2019-02-27 18:12:47.848	ainars@confero.tech	Login	User has successfully logged in from IP: 127.0.0.1
2019-02-27 18:09:32.689	ainars@confero.tech	Logout	User exited system by presing the button Logout
2019-02-27 18:09:22.371	ainars@confero.tech	Page view	User opened page: Application (TPP)
2019-02-27 18:09:19.88	ainars@confero.tech	Page view	User opened page: Applications (TPP)
2019-02-27 17:54:10.103	ainars@confero.tech	Page view	User opened page: Token
2019-02-27 17:54:05.783	ainars@confero.tech	Page view	User opened page: Tokens list
2019-02-27 17:53:28.683	ainars@confero.tech	Page view	User opened page: Tokens list
2019-02-27 17:53:24.902	ainars@confero.tech	Page view	User opened page: Tokens list
2019-02-27 17:52:48.957	ainars@confero.tech		
2019-02-27 17:52:46.351	ainars@confero.tech		
2019-02-27 17:49:15.776	ainars@confero.tech		
2019-02-27 17:49:12.67	ainars@confero.tech		
2019-02-27 17:38:53.73	ainars@confero.tech		
2019-02-27 17:37:49.371	ainars@confero.tech		
2019-02-27 17:37:45.23	ainars@confero.tech		
2019-02-27 17:37:45.177	ainars@confero.tech		
2019-02-27 17:08:12.928	ainars@confero.tech		
2019-02-27 17:08:09.788	ainars@confero.tech		
2019-02-27 17:07:55.391	ainars@confero.tech		

User edit

E-mail: Aleksandr@confero.tech

Name: Aleksandrs

Surname: Berzins

Status: Active

Roles:

Available		Selected
<input type="checkbox"/> External user	→	<input type="checkbox"/> Administrator

Buttons: Save, Change password



Contact Information

Sergejs Mazurs

Deputy Chief Executive Officer (dCEO)

Confero Technologies, SIA

sergejs.mazurs@confero.tech

Mob.: +371 2959 6540

Tel.: +371 6777 5513

23 Elizabetes St., Riga, LV-1010, Latvia

**Our Open
Banking solution
is the number one
choice for easy and
reliable PSD2
compliance**