



## Cyclos 4 Features

Cyclos is a feature-rich online banking solution that is easy to use and maintain, flexible, secure and highly customisable. Cyclos provides a range of banking and payment options, a complete e-commerce system and high and low end mobile access channels. Cyclos is a scalable and cheap opportunity for banks to offer branchless banking.

Cyclos is used by banks, C3 networks, MFIs, barterers, innovative currencies and time banks. The dynamic structure of Cyclos allows organisations to 'build' a dedicated payment system from scratch just by changing the configuration (without the hassle to make code changes).

*Discover the Cyclos 4 PRO features in these two sections:*

### Cyclos 4 feature list

Provides a detailed overview of the many features of Cyclos 4. An asterisk is placed after the feature to indicate:

- \* Possible through Cyclos scripting engine
- \*\* Planned features

### Cyclos 4 system information

Information about structural issues concerning Cyclos (*architecture, security, interoperability and hosting*)





## User interfaces & access

- Web front-end
- Mobile App (Android, iOS)
- Mobile POS (Android, iOS)
- SMS operations
- API (restful and swagger implementation)
- Cards (NFC supported)
- Webshop payment page
- IVR \*
- USSD \*

## Payments

- User to user payments
- Internal payment (between own accounts)
- System to user payments
- User to system payments
- Pay external (non registered) user using their mobile number or email address
- Scheduled payments (installments)
- Recurring payments
- Invoice payments
- Bulk payments
- Webshop payments
- Cash-in cash-out payments
- PIN-less payments (optional thresholds, e.g. max payment amount and daily limit)
- Payment requests
- Custom payment fields
- Multi level transaction approval (authorizations)
- View authorisation flows
- Show transaction details
- Qualify transactions
- View qualification of other users
- Roll-back payments
- Loan repayment \*
- Pay to QR code
- Pay to NFC card
- Pay to custom card

## Banking

- Multiple currencies
- Account numbers (custom or standard, e.g. IBAN)
- Loans
- Demurrage fees
- Interest fees
- Transaction fees
- Set custom conditions for fee applicability
- Scheduled fees (contribution)
- Brokering fees
- Group credit limit
- Individual credit limit
- Credit limit change log
- Credit overview & search
- Savings accounts \*\*
- Minimum payment amount per payment
- Maximum payment amount per payment, per day, per week and per month.
- Maximum number of payments, per day, per week and per month.
- Restrict destination of payments
- Access rules per payment types
- Transfer filters per account type
- Transfer status flows
- Unique transaction ID per transaction
- Unique payment settings per channel (SMS, etc.)
- System accounts (debit, community, etc.)

## Account information

- View account summary
- View current balance
- View charges & fees
- View payment history
- Print & export payments
- Search payments (user, date, description, etc.)
- View payment details
- Print payment details
- Dynamic payment filters
- View average age of account balance
- View average maturity of account balance





## User functions

- Registration form
- Profile completion progress bar \*\*
- Update profile
- User defined language
- Geo-location per address (Google Map)
- Multiple pictures per profile
- Multiple addresses
- Multiple phones
- Verify phone for SMS banking
- Manage passwords
- Insert & manage custom images
- Upload & manage documents
- Notification preferences (per channel)
- Manage contacts
- User directory search
- Show users/business on Map
- Search users by distance
- Search users by group / branch
- Invite (new) user
- Business referrals
- Custom user forms
- Custom user operations

## Passwords & authentication

- Login password
- Transaction password
- Verification code (OTP) by email or SMS
- Change PIN
- CAPTCHA input on public forms
- Complete virtual keyboard (optional)
- Smart secure virtual keyboard (optional)
- Recover password (optional)
- Reset password
- Set Bcrypt hashing strength
- Optional security questions

## User management

- Register users
- Disconnect user
- Block / unblock user
- Disable / enable user
- Delete user
- Change group
- Give individual permissions (product)
- Perform actions in behalf of user
- Activate 'pending' users (public registration)
- Send message to user
- Send message to group
- View connected users (per user role)
- Show member activities
- Filter by branch region
- CRM features (user records)
- User comments, history search
- Define registration agreement
- View user agreement history
- View profile changes history
- Manage documents
- Upload documents
- Show agents/brokers
- Show users of agent/broker
- Bulk operations (run on selection of users)

## Usability

- Easy navigation
- Personal dashboard page
- Quick operation icons
- Quick search (users, contacts, adverts)
- Status overview (balances, last login, etc.)
- Real time notifications
- Login with userID, phone number or e-mail
- Picture viewer with navigation
- View help file





## System configuration

- Create multiple networks (a network can behave as if it is as an independent installation of Cyclos)
- Create local account, system and (multi) network administrators
- Create groupsets (to organize groups)
- Define URLs (domain name) for networks and groups
- Set group(set) visibility
- Localisation (language, formatting, timezone) per group(set)
- Customize session timeout per group
- Set permissions through products
- Assign multiple products to groups
- Customised filters for users and advertisements searches
- Fully indexed searches
- Create new access channels
- Define generated login name
- Create custom features (scripting module)
- Create & manage document categories
- Import users from file
- Create new credential (password) type
- SEO (sitemap.xml per network for all pages)

## Content management

- Intuitive site design (color pickers)
- Multiple websites (per group / branch)
- Create new menu items
- Manage content pages
- Create & manage banners
- Manage footers/headers
- Manage message board
- Upload logos
- Define logo/header for pdfs (e.g reports)
- Create new themes (styles, images, etc.)
- Import / export themes

## Messaging

- Send rich text message to user
- Send bulk messages (mailings) by admin or agent
- Define message categories (per user group)
- Forward internal messages to e-mail
- Message history (inbox, sent, trash)
- Purge messages in trash after period (automated task)
- Member to member email messages

## Analytics & Reporting

- Data on expenditure
- Data on income
- Number of logins
- Groups/branches numbers of users
- Percentage of users not trading
- Account information
- Advertisements
- References
- Reporting templates

## Translations

- Multiple translations per system
- Incremental translation keys (only save customisations)
- Online translation management
- Category browsing
- Search for translation keys / values
- Update translation keys / values

## Alerts & Logging

- Verbose error logging
- Search errors by period
- Search errors by user
- View error details (complete stack trace)
- Send notifications on error by email or SMS.
- Receive notifications on events (server startup, user blocked, ip blocked, etc.)





## Marketplace

- Create / edit advertisement
- Multiple pictures per advertisement
- Rich text for advertisement editing
- Schedule advertisement
- Authorize advertisement (admin/broker)
- Select address per advertisement
- Custom search filters
- List new advertisements
- Category browsing
- Multiple advertisement categories
- Create advertisement categories
- Geolocation search (distance filter)
- Contact seller
- Public advertisement questions / answers
- Notification on ad status change
- Custom advertisement fields
- Advertisement matching notifications

## Account operators

- Create operator groups (by user type)
- Define permissions for individual operators or operator groups
- Operators overview
- Show transactions per operator
- Disconnect operator

## Agents / Brokers

- Multiple broker per user
- Set main broker
- Register new users
- Manage user data
- Print & export users
- Perform operations as user
- Define broker permissions
- Send mailing to 'my users'
- View connected users
- Receive notifications about users
- Manage passwords of user
- Manage user access
- Broker commission

## Web shop & shopping cart

- Multi-store management
- Stock management
- Out of stock warning
- Product number management
- Define delivery address
- Define shipping methods / prices
- Define estimated delivery time
- Promotional price
- Price negotiation process
- Display available quantities
- Product comments
- Order tracking
- Add comments to order
- Display cart content
- Place order (checkout)
- Accept / reject order
- Order number generation
- View purchases history
- Notifications on order status changes
- Saved shopping cart (in the database)

## Gift vouchers / Loyalty points

- Create & manage vouchers types
- Set voucher redeeming options (e.g. possible weekdays)
- Define voucher layout (logo)
- QR code generation
- Print & export vouchers
- Buy & print voucher by user
- Vouchers overview & search by admin
- View my vouchers by user (Web & Mobile app)

## Commercial barter

- Find users with low balances
- Match high balances to low balances on map
- Alert when a user balance is below zero for a certain time \*\*
- Alert when a user balance is above a certain amount for a certain time \*\*
- Payment wall





## Mobile POS (Point of Sale)

- Android app
- Receive payment
- Make payment to customer (cash-out)
- Print daily transaction list (POS owner)
- Receive notifications by SMS
- Multiple user identifiers (QR/barcode, userID, NFC card or phone)
- NFC card will start up the app in POS mode and open receive payment page with the user identified by NFC card
- Format NFC card
- Assign NFC card to customer
- Batch NFC cards creation & personalization
- Interface for integration with third party POS or ATM networks
- Export tokens/cards as CSV file

## SMS banking

- Register new user by SMS
- Retrieve account information
- Retrieve payment details
- Make payment
- Activate phone via SMS (confirmation code)
- Receive notifications by SMS

## Mobile app

- Android app
- iOS app
- Build in phonegap
- Source code for large licenses on request
- Make payment
- View account balance, credit limits
- View account history
- Make payment (to user, to system)
- Search users
- Register user
- Register user as shop (other users)
- Add user to contact list
- Customisable layout
- Customisable entry page / logo
- Add menu item (quick access icon)
- Add custom pages in app





### Architecture

Cyclos 4 has been built on Java enterprise technologies. The client connects to a Google Web Toolkit (GWT) front end application or through one of the interfaces (see below). The application server is protected by a solid security layer and uses the Spring Framework. The services on the application server uses JPA (aided by Querydsl) to communicate with a Postgres Database server. All transactions are stored as double entry bookings in the accounting system. Cyclos can run as stand alone system independently from other currency systems. There is an option to store files (e.g. documents, pictures, other file uploads) in a external file system (not in the Cyclos database). Amazon S3 storage service is also supported.

### Hosting requirements

Cyclos can run on a web container such as Apache Tomcat and Jetty, or application servers such as Glassfish, JBoss, IBM Websphere and Oracle Weblogic. The database for Cyclos is the Open Source database PostgreSQL. Cyclos is also available as a Docker image at the public Docker repository.

*The minimal memory space requirements to run a single Cyclos instance is 500 Mb.*

### Interoperability (interfaces)

To communicate with third party software products, the entire internal services layer can be accessed through a web service API (Application Programming Interface). This will make all Cyclos features available to third parties.

Native Java clients can connect directly via Java remoting over HTTP(S). Clients in other languages can use an API with JSON messages over HTTP(S). Cyclos has a RESTful web services interface that implements the OpenAPI specification. There is also a PHP client library available which mirrors the services API. In case third party software requires specific interface services other than the available Cyclos API formats, a 'custom web service' can be created to provide those methods.





## Security

Since the beginning the Cyclos development team followed the security guidelines defined by the ISO 27002 and EBA (European Banking Authority) standards. The code is constantly tested by an advanced set of automated security tests. Permissions and roles are checked on every request at the internal services level.

*The following security areas / points have been addressed:*

- Confidentiality, integrity, authenticity are guaranteed by security checks in combination with http secure (https)
- Resistance to attacks as XSS, CSRF, SQL injections
- All passwords hashed with 'salted' SHA2
- All identifiers are ciphered when sending to client (browser)
- Use of cookies limited to user session
- Security alerts for administrators
- Verbose logging including operation data, users, timestamp
- IP whitelist
- URL restriction per group

Licensees can get access to an advanced security document, published on our wiki.

## Scalability & availability

The Cyclos application supports full clustering (application web container).

The database has been optimised to support database clustering and synchronous replication.

