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The Document Business
A KYOCERA GROUP COMPANY

IF IT WORX, IT'S
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TA/UTAX Cloud Information Manager:

Security White Paper

Version 2.9

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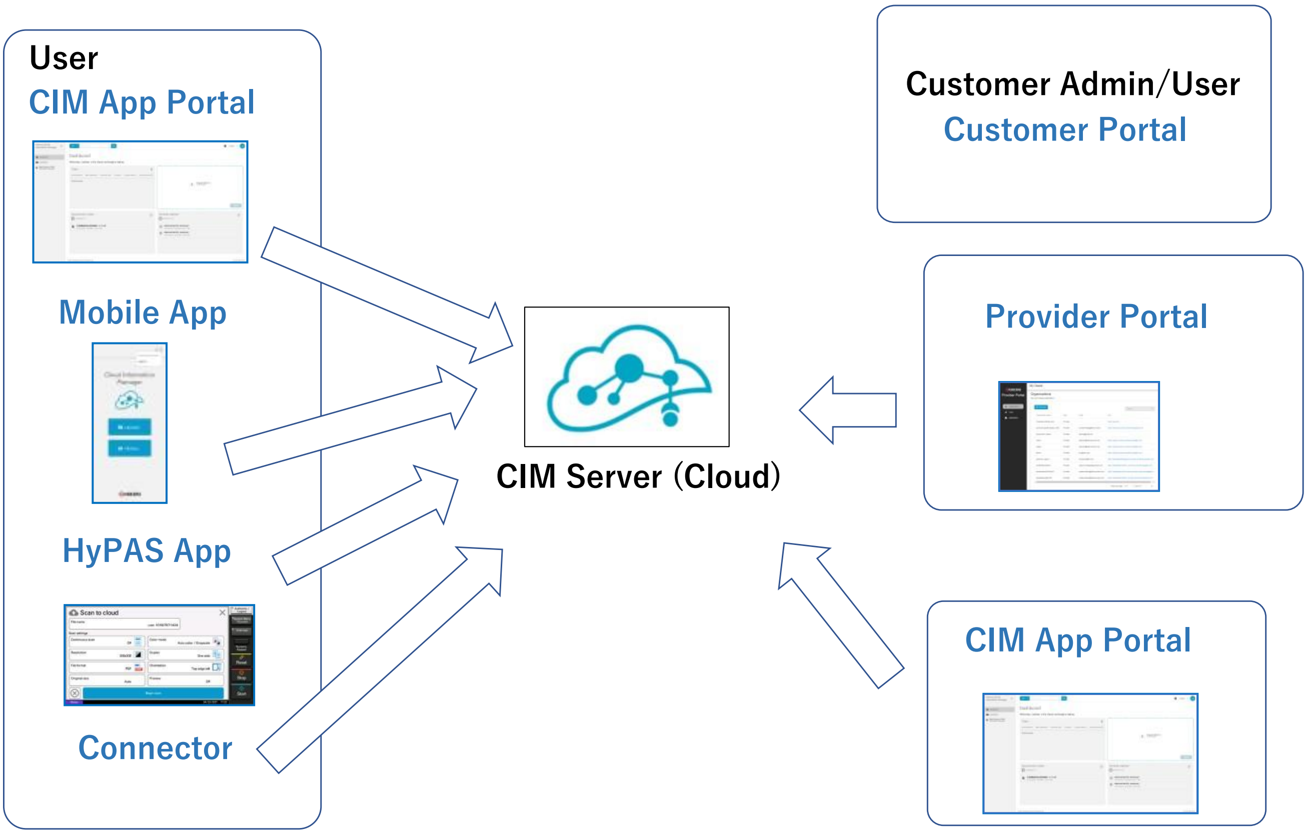
About this document

This document describes TA/UTAX Cloud Information Manager (CIM) version 2.9.

1. Overview

TA/UTAX Cloud Information Manager (CIM) is a cloud-based document management system that allows users easy to manage documents, scan, upload, index and store the documents.
This white paper informs dealers about security measures in CIM. TA/UTAX's priority is to provide secure protection of information assets that are handled by CIM. These information assets are rigorously protected by the secure configuration and security features of CIM.

The system components are shown in the following architectural diagram:



The key components of the CIM system are described below:

CIM Server (Cloud): CIM Server is a cloud document management system that provides document management and user management features to customers.

Customer Portal: The customer portal is a one-stop portal where customer can manage common settings for CIM and other available solutions, as a common platform for supporting multiple applications. The customer admin or customer user can access this portal using a web browser. They can launch a landing page or application settings page within each application portal as well.

Provider portal: The provider portal is an application that supports CIM organization management, user management and document class management. The provider (RHQ, SCs, Dealers, Distributors) can access the provider portal using a web browser. They can add, edit, or delete organizations for child providers or for their direct customers.

CIM App portal: The customer admin or customer user can access the CIM App portal using a web browser. The customer admin can add user accounts for their own organization and configure access control of document classes. The customer user can upload, edit, delete and search documents.

HyPAS App (MFP client): The HyPAS application must be installed for Multi-Function Printer (MFP) to be able to use the CIM system. The HyPAS application connects to the CIM server. Customers can scan their documents in MFP and upload to the server.

Mobile application (iOS/Android): The mobile application connects to the CIM server. The customer users can upload a photo and local file to CIM server.

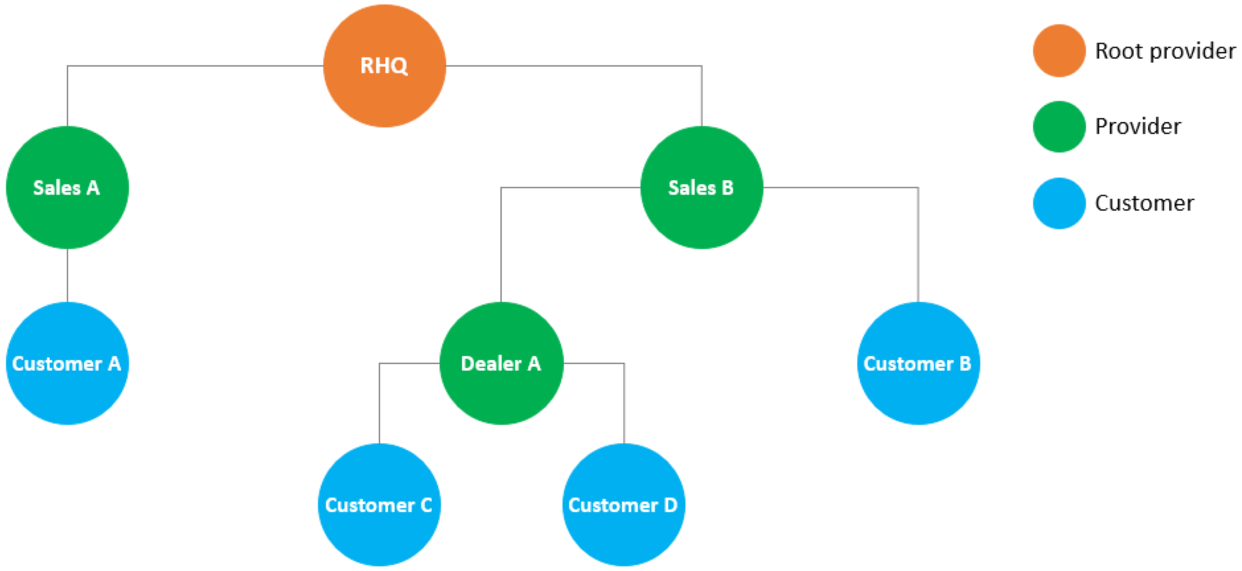
Connector: By developing a connector, CIM can integrate with other solutions, such as ScannerVision.

2. Multitenancy

CIM uses multi-tenancy to accommodate multiple sales companies, dealers, and customer organizations. Each sales company, dealer, and customer are treated as one organization. Access control is enforced through a hierarchical tree structure. (Fig. 2-1)

Organizations are classified into two types: a provider organization and a customer organization. A provider organization is focused on managing one or more customer organizations. Provider organizations have auditing and reporting features while customer organizations would provide the document management feature.

The hierarchical structure is patterned after the common sales hierarchical structure used in TA/UTAX. An RHQ (regional headquarters) is the parent organization (root provider organization) with sales companies under the RHQ as children provider organizations. Customers of sales companies would be the customer organizations and leaf nodes in the hierarchical tree structure.



(Fig. 2-1) Hierarchical structure of CIM Organizations

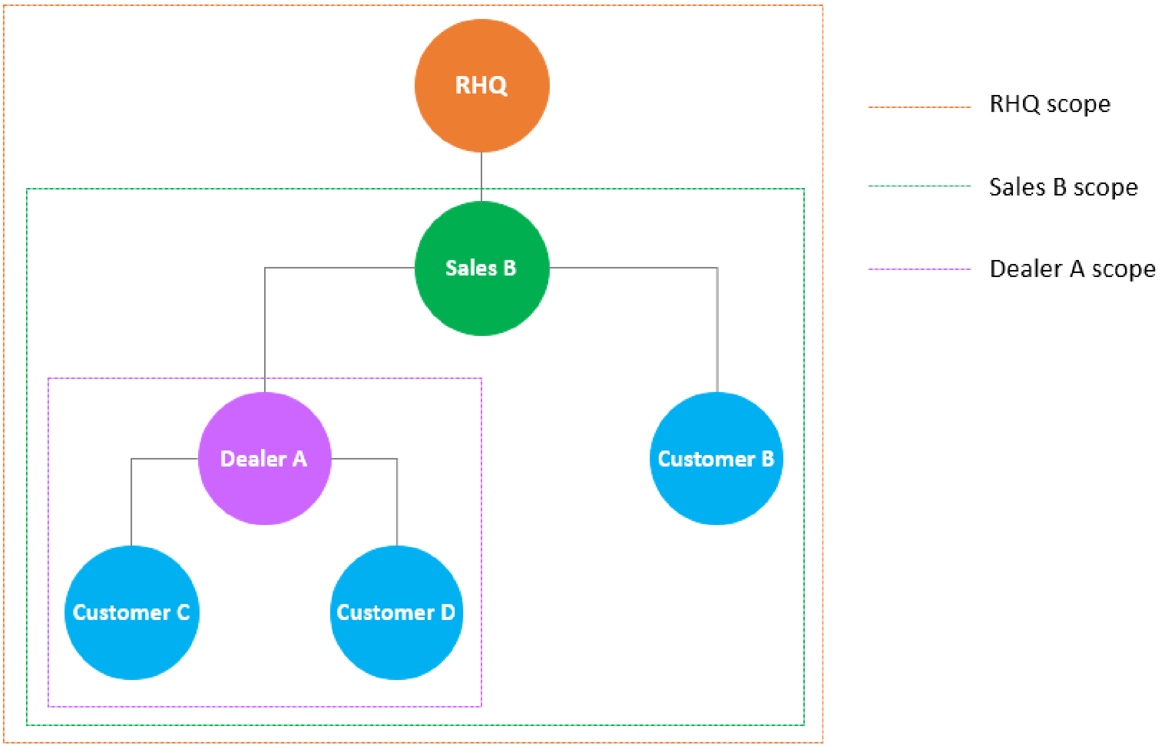
Any organization cannot view the data of another organization except for the parent organization.
The parent provider only can get usage counter information and the contact information of the organization representative from the customer. The usage count is the data related to the license information such as OCR page, document count, document size usage and the contract information.
Data is scoped and access to data is limited. (Table 2-1)

User type	Users of customer organization	Documents of customer organization	Document class information	Contract information (OCR count, document count and size)
Provider Admin/Support	Inaccessible	Inaccessible	Accessible	Accessible
Customer Admin	Accessible	Accessible	Accessible Access right management	Accessible
Customer user	Inaccessible	Accessible	Inaccessible	Accessible Can view contract information only

(Table 2-1) Access to organization and user data by user type

Scopes are present between parent and child organizations. At the organization level, parent/child organization can share the document class definition data (document classes and attributes of the document classes).

Also, the parent organization can manage the license-related information of the customer child organization (e.g. how many OCR pages, document size allowed) to help with billing. (Fig 2-3)



(Fig. 2-3) Access to license-related information for each organization

The direct visibility of this data is only between parent and child organization. But RHQ can retrieve the entire child organization's usage data. CIM's provider portal can generate OCR usage report of the entire organization hierarchy but the detail organization information will be anonymized.

3. Communication security between modules

Transport Layer Security (TSL) is a standard security technology for establishing an encrypted link between a server and a client. In CIM, TLS is used to secure and protect sensitive information that is shared between CIM and a browser, device, mobile or database. This information includes:

- CIM user credentials and passwords
- User data
- Document information (document, OCR data, index data, metadata, comments, etc)
- Document count metrics (OCR page counts, document size, document count, etc.)

4. User Identification and Authentication

When accessing CIM, the user must log in with an activated account. An unauthorized user cannot access CIM. The following features are supported as security features for login.
CIM uses OAuth 2.0 authentication method by keycloak. Keycloak is a user authentication management software sponsored by RedHat.

4.1. Account Lockout Policy

The Account Lockout Policy protects CIM from password cracking attacks. When a user fails to login a predetermined number of times, the user account will be locked for a certain period.

As shown in the table below, when reaching the account lockout threshold for failed login attempts of three times, the account will be locked. The setting will unlock the account after 30 minutes. The locked account also can be unlocked by the admin manually. Password reset will unlock the account if the login attempt is coming from same browser (same tab_id) that requested password reset.

Number of continuous failed login attempts	3 attempts in 15 minutes
Auto Unlock Time	30 minutes

4.2. Password Policy

A user needs to employ a strong password that is difficult to be analyzed and must be applicable to the CIM Password Policy.

A password that does not meet the password policy is prohibited. This policy prevents users from setting simple passwords and guards against unauthorized access by a third party.

All authentication is securely processed based on OAuth 2.0 using keycloak.

The password length and complexity of password are defined in the table below.

Password Length	Between 8 to 64 characters
Password Complexity	Include at least one character from each category: Upper case (A ~ Z) Lower case (a ~ z) Numbers (0 ~ 9) Symbols (!"#$%&'()*+,-./:;<=>?@[]^_`{|}~)

4.3. Username Policy

Username policy is put in place to verify if the value is a valid username. This prevents special characters which may be used in SQL injection[1] vulnerabilities.

Username Length	Between 4 to 64 characters
Prohibited characters	Symbols \ / : , ; * ? " < > | [ ] { } $ % ` & ( ) + =| ! # ' ~ ^ spaces

Note: Users who have created a username including spaces or ! # ' ~ ^ prior to v2.5.2 may still login and continue CIM usage, however, it is recommended to update your login username. When updating your username, the new policy must be followed to save.

4.4. First name/Last name policy

A policy for first name/last name fields is in place to prevent certain special characters which may be used in SQL injection vulnerabilities. The validator checks if the value is a valid person name as an additional barrier for attacks such as script injection.

Allowed symbols	-@.'`+:,

Note: Users who have created a first name/last name prior to v2.5.2 which included any symbols other than the above mentioned, may continue CIM usage, however, it is recommended to update your first name/last name fields to follow the new policies. When updating your first name/last name fields, the new policy must be followed to save.

4.5. PIN Authentication policy

PIN authentication is an authentication method available only when logging in through the HyPAS application. Users can log in using a 6-digit or 8-digit numeric code that they set themselves. Administrators can configure the code length policy to balance ease of use and security.

Initial setting	Off
PIN code length	6-or 8-digit codes (Initial value:6 digit)

4.6. IC Card Authentication policy

IC card authentication is an authentication method available only when logging in through the HyPAS application. It's simple and fast authentication process enhances overall user convenience.

4.7. Multi Factor Authentication policy

Email-based Multi-Factor Authentication (MFA) leverages users' existing email addresses, adding an extra security layer by requiring a verification code sent via email, reducing the risk of unauthorized access even if passwords are compromised.

Initial setting	Off
Verification code expiration	5 minutes

The account lockout policy is enforced if the number of authentication failures reaches the specified threshold (3 times), even when MFA is enabled.

[1] Refer to SQL injection - Glossary | CSRC (nist.gov) for more detail information.

4.8. Microsoft Entra ID

CIM give administrators to configure their organization to link their Entra ID tenant, sync users from the Entra ID tenant to DCP and give users the option of logging in using their Entra ID credentials.

Following the OAuth 2.0 authentication flow, a pop-up window for entering Entra ID credentials will be managed by Entra ID, including MFA if enabled from the Entra ID-side. Note that the Entra ID MFA is separate from and not managed by the MFA setting on the customer portal.

In v2.9, Microsoft Entra ID authentication is available for the customer portal.

5. Keycloak security features

CIM uses keycloak as an identity/authentication management service. Keycloak is an open-source authentication management system yet, supports various security features.

5.1. Keycloak features

Keycloak provides the following features:

- OAuth 2.0 support.
- Admin Console for central management of users, roles, role mappings, clients and configuration.
- Account Management console that allows users to centrally manage their account.
- Theme support - Customize all user facing pages to integrate with your applications and branding.
- Login flows - optional user self-registration, recover password, verify email, require password update, etc.
- Session management - Admins and users themselves can view and manage user sessions.
- Token mappers - Map user attributes, roles, etc. how you want into tokens and statements.
- Not-before revocation policies per realm, application and user.
- CORS support - Client adapters have built-in support for CORS.
- Client adapters for JavaScript applications, WildFly, JBoss EAP, Fuse, Tomcat, Jetty, Spring, etc.

5.2. Threat model Mitigation

Keycloak mitigates the below possible security vulnerabilities as an authentication server. At this moment, CIM has brute force attacks protection is configured and plan to adopt more security features from keycloak.

- IP restriction
- Port restriction
- Password guess: brute force attacks
- Read-only User Attributes
- Clickjacking
- SSL/HTTPS Requirement
- Cross-site request forgery(CSRF) Attacks
- Unspecific Redirect URIs
- FAPI compliance
- Compromised Access and Refresh Tokens
- Compromised Authorization Code
- Open redirectors
- Password database compromised
- Limiting Scope
- Limit Token Audience
- Limit Authentication Sessions

6. Data Protection

6.1. Protection of Stored Data

CIM's information assets must be protected and not leaked or lost. TA/UTAX implements security protection measures for stored information assets and a data recovery support through the features described below.

6.1.1. Access Control

CIM allows administrators to configure detailed access permissions for each document class on a per-user basis. Users can access CIM's document information (documents and metadata) according to the permissions assigned to them.

Access rights to documents can be assigned for each document class. This access control enables organizations to achieve greater flexibility and security in managing confidential information.

6.1.2. Authentication

CIM database requires user authentication to gain access to database data. Authentication credentials are configured during initial release of the instance.

6.1.3. Encryption

CIM database uses AES256 algorithm for encryption.

6.1.4. Data Backup

Daily backup for CIM database runs automatically. It is stored on Google Cloud Storage and encrypted by AES256. Google Cloud Storage are protected in two ways: geographic redundancy and incremental backups.
Geographic information is obtained by synchronously copying a stored storage object between data centers more than 100 miles away.
Geographic redundancy protect a stored storage objects from down of data center.

6.2. Protection of Communication Data

CIM protects communication data regarding user access to use CIM, and data communication to transfer data between CIM and devices, respectively.
In order to protect CIM communication data from masquerading, tapping or modifying the data, the communication data is encrypted, and CIM components are mutually authenticated.

6.2.1. User Access

When a user accesses CIM from a web application using a browser, an authenticated communication channel is established. CIM user can access CIM web portal from the Web browser's client UI regardless of the user role. When a user accesses CIM web portal, the user is always identified and authenticated. If this identification and authentication are successful, access token will be issued and the user can access CIM web portal based on user's role. CIM web portal protects the communication data through HTTPS.

6.2.2. Access token and refresh token

Once the authentication is successful, an access token and refresh token will be issued and user session will be maintained. User session will be used to access for all document operations. Access token will be used to access user management and contract management operations. The access token's life span is 15 minutes and can be refreshed using refresh token whenever any access of BE API after access token expired. UI will be logged out in case of 15 minutes inactivity.

6.2.3. HTTPS protocol

HTTPS works over underlying secure protocols (TLS 1.2) that encrypt all traffic between browsers and servers. SSL and TLS require a certificate with a private key, a public key, domain information, and a chain of signatures by certificate authorities.

6.3. Secure communication between the CIM server and databases

CIM will establish network connection to database using TLS and AES 128 encrypted network traffic.

6.4. Security vulnerability testing

In order to keep the CIM application up-to-date with the latest security measures the following schedule will be followed for security vulnerability assessment:

- Perform internal security vulnerability assessment for each software release build release.
- Periodic vulnerability assessment in accordance with server management regulation.
- If the configuration of the public server has changed significantly, such as an upgrade, perform vulnerability assessment as necessary.

7. Device (MFP/Mobile) Authentication

To protect sensitive information transmitted between CIM and devices, security is enforced through HTTP over TLS. The used version of TLS is 1.2.
User must authenticate through CIM authentication from the device application to establish the network connection between CIM and the device.
The client authentication will be authenticate using user id, password, client-id and client-secret. Mobile and MFP have different client-id and client-secret.

8. Google Cloud Platform Security Technical Details

CIM is hosted on the Google Cloud Platform. GCP meets the broad set of internationally recognized information security controls and industry-specific compliance standards, such as ISO 27001, HIPAA, FedRAMP, SOC 1/2/3, GDPR, CCPA (see the detailed list of compliant standards in GCP Cloud Compliance, https://cloud.google.com/security/compliance).

The hosting environment is designed to utilize the GCP provided services and security features to help secure and monitor our application. The various features that are utilized include:

- Various GCP credential for login/access
- Security logs
- Instance isolation
- Firewalls/API access
- Secure HTTPS access points
- Network security (VPC isolation, Network Security groups, Network Access Control List, Internet Gateway, etc.),
- Storage
- Simple Notification Service monitoring CloudWatch application logs

CIM is deployed to the following GCP regions:

- Japan
- EU
- USA

CIM uses managed storage and PostgreSQL Database hosted on GCP.