RICOH Unified Communication System

Security White Paper (Ver. 3.5)

- UCS terminals P3500, P1000
  P3000, S7000
- Apps (for Windows)
  (for iPad/iPhone)
  (for Mac)
  (for Android)
- UCS for IWB

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* This white paper does not target RICOH Unified Communication System Advanced (UCS Advanced).
## Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Modification from the previous version</th>
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<tbody>
<tr>
<td>August, 2013</td>
<td>3.2</td>
<td>Information about apps for Mac and iPhone has been added.</td>
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<tr>
<td>April, 2014</td>
<td>3.3</td>
<td>Information about P1000 has been added.</td>
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<tr>
<td>August, 2014</td>
<td>3.4</td>
<td>Information about P3500 and Android app has been added.</td>
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<tr>
<td>January, 2017</td>
<td>3.5</td>
<td>Information about the Service platform which became to be high availability by distributed DC configuration has been changed. Information about UCS for IWB has been added.</td>
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The Ricoh Unified Communication System performs communication through a service platform built on the cloud. The service platform controls the connections between terminals and relays video and audio data.

### Service Platform (Cloud)

- **Ensure availability with redundancy**
  - All service platform components, including firewalls, network equipment and servers, are redundant.
- **Access restrictions**
  - The firewalls prevent unauthorized access.
- **Vulnerability measures**
  - A tool-based vulnerability assessment is conducted every three months. If any vulnerability is detected, countermeasures will be taken within five business days.
- **System monitoring**
  - In addition to monitoring within the service platform, normal conference operation is checked from the outside.

### Communication

1. **Session establishment and call control (commands)**
   - After establishing a session, the information needed for call control is encrypted by TLS.
2. **Video and audio data transmission (data)**
   - Video, audio, and PC screen-sharing data are all encrypted.
   - The SRTP data transfer method is used.

### Terminals

- **Vulnerability measures**
  - When a vulnerability is found in the software, a software update will be distributed via the Internet.
- **Preventing unauthorized use**
  - If a terminal is lost or stolen, it will be rendered inoperable by the data center to prevent unauthorized use. Each terminal is specified by its CID (contact ID). A UCS terminal contains a mechanism for identifying itself as a genuine client terminal. In the case of Apps, terminal authentication is performed using both a CID and password.

### Mutual Authentication

- **Limiting communication partners**
  - The system can make connections when the devices have been mutually authenticated in advance by using the web-based management utility or the application on each device. However, it is also possible to accept calls with contact IDs from unregistered users if the user sets up the terminal to permit such calls. (Supported exclusively by P3500/for Windows.)
Session establishment and call control
(command)
The transferred data is encrypted by TLS. M2M communication data, contact list, and other data are protected by encrypted communication.

Video and audio (data)
Video encoding method: H.264 SVC (H.264/AVC Annex G)
Streaming data transfer method: SRTP

Restricting access to the service platform from the Internet
The firewall accepts only HTTPS access using a browser from the management utility and access through a designated port from a successfully authenticated Ricoh UCS terminal. A tool-based vulnerability assessment is conducted every three months.

System monitoring
The resources, including the CPUs, memory and network band, as well as the logs are checked using monitoring software.
Dedicated software deployed at several locations outside the system checks whether the conference session can start and is executing normally.

When a Ricoh UCS terminal starts, it connects to the service platform and displays the contact list. After start-up, all data transfer is encrypted by TLS. Both video and audio data is encrypted by a communication protocol called SRTP (Secure RTP). If the video and audio data should somehow be secretly monitored or saved by a third party, it cannot be decrypted.
Service platform as a whole

The service platform consists of several data centers. Even if a single data center becomes unavailable due to a natural disaster or a large-scale problem, its functions are automatically transferred to the other servers, and the service can be continued. Each data center has acquired ISO27001 certification.

Configuration of the infrastructure in each data center

The firewalls, network equipment, database, and application servers are all redundant. The video distribution servers are also redundant, and can be scaled out according to an increase in the number of users to ensure sufficient resources. The database that stores important data is always located behind a double firewall to prevent data leakage. The connection to the Internet is also redundant.

Customers’ Private Information

Private information provided during the contract process is not recorded in this service platform. It is managed only by the backend system within the Ricoh Network.

Vulnerability measures

A tool-based vulnerability assessment is conducted every three months. If any vulnerability is detected, countermeasures will be taken within five business days.
Terminal Security (Common)

Restricting connections with other terminals
A Ricoh UCS terminal exchanges video and audio with other terminals around the world through the Internet. To prevent unexpected connections, a UCS terminal only accept calls (for establishing the connections for conferences) from the terminals registered in the Contact List. To register a user in the Contact List of another user, a contact registration request needs to be sent to the other party’s terminal using the management utility on the Web or in an application. When the other party approves the request, the terminals are registered in the Contact Lists of both parties.

However, it is also possible to accept calls with contact IDs from unregistered users if the user sets up the client to permit such calls (contact ID connections). (Supported exclusively by P3500/for Windows for both calling and receiving calls.)

Vulnerability measures
When any software vulnerability is found, a software update will be distributed through the Internet.

Reporting from a terminal
To diagnose problems occurring in the service, the terminal sends (reports) its status.

The information collected from the terminals is used by Ricoh only to analyze the problems in the software and hardware, never for other purposes.
Terminal Security (P3500 and P1000)

Preventing information leakage
The information stored in the internal storage media, including programs and application logs, is password protected. (Even if the storage media is connected to a PC, the content cannot be read.) The user information required for terminal authentication is encrypted.

Preventing program tampering
The firmware is signed with a digital signature. If it is tampered with, verification of the digital signature fails and the terminal will not start.
When the PC Screen Share feature is used, intrusion (writing) of computer viruses and other malware from the PC is prevented by making the storage area of the terminal read-only before it is connected to the PC through a USB port.

Preventing unauthorized use of a Ricoh UCS terminal
- A UCS terminal has a mechanism for identifying itself as a genuine client terminal.
- If a terminal is lost or stolen, it will be rendered inoperable by the data center to prevent unauthorized use.
  (In addition, the CID of a lost or stolen terminal can be reassigned to a different terminal. Therefore, it is possible to use the same CID and Contact List on the new terminal.)

Authentication and encryption for wireless LAN
The following protocols are supported.
Authentication protocols (wireless LAN):
  Open key system authentication, shared key authentication, WPA-PSK, WPA2-PSK, WPA-EAP(*), and WPA2-EAP(*)
Encryption protocols (wireless LAN):
  WEP 128bit/64bit, TKIP: WPA-PSK/WPA2-PSK/WPA-EAP/WPA2-EAP
  AES: WPA-PSK/WPA2-PSK/WPA-EAP/WPA2-EAP

* For WAP-EAP and WAP2-EAP, only the PEAP method is supported.
Terminal Security (P3000 and S7000)

Preventing information leakage
All information stored in the internal storage media, including the programs, user information, and application logs, is encrypted. (Even if the storage media is mounted on another main board, the content cannot be decrypted.)

Preventing program tampering
The firmware is signed with a digital signature. If it is tampered with, verification of the digital signature fails and the terminal will not start.
When the PC Screen Share feature is used, intrusion (writing) of computer viruses and other malware from the PC is prevented by making the storage area of the terminal read-only before it is connected to the PC through a USB port.

Preventing unauthorized use of a Ricoh UCS terminal
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· Encryption protocols (wireless LAN):
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  AES: WPA-PSK/WPA2-PSK
Terminal Security (for Windows)

Preventing information leakage

1) User information
   Information on the user and environment used by the application is encrypted in the client terminal and saved in
   the profile folder of Windows.

2) Application logs
   Application logs are saved in the profile folder of Windows, which cannot be accessed by other users.

3) Information embedded in the program
   The application is encrypted so that it cannot be disassembled easily in order to mitigate the risks of information
   leakage.

Preventing program tampering
   The application has a tampering detection mechanism. If it is tampered with, the attempt is detected and the application
   will not start.

Preventing unauthorized use of the application
   • This application has a mechanism for performing authentication using both a CID and password.
   • If the CID or password, or both are lost or leaked, the CID can be disabled by the data center.
   • The service can not be used unless the user registers an email address and changes the initial password.
Preventing information leakage

1) User information
   a. The information on the network proxy is encrypted and saved by the Keychain Service provided by the MacOS.
   b. Information on the user and environment used by the application is encrypted using the function of the MacOS and saved in the user library folder.

2) Application logs
   The application logs are saved in an area dedicated for the application using the Sandbox function provided by the MacOS, which cannot be accessed by other applications.

Preventing program tampering
   The application is signed using the Sandbox function provided by the MacOS. If it is tampered with, the attempt is detected and the application will not start.

Preventing unauthorized use of the application
   • This application has a mechanism for performing authentication using a CID and password.
   • If the CID or password, or both are lost or leaked, the CID can be disabled by the data center.
   • The service can not be used unless the user registers an email address and changes the initial password.
Terminal Security (for iPad/iPhone)

Preventing information leakage

1) User information
   Information on the user and environment used by the application is encrypted and saved using the Keychain Service provided by the iOS, which cannot be accessed by other applications.

2) Application logs
   Application logs are saved in an area dedicated for the application using the Sandbox function provided by the iOS, which cannot be accessed by other applications.

Preventing program tampering
   The application is saved in a dedicated area using the sandbox function provided by the iOS. An iOS application needs to be signed, which ensures that it cannot be tampered with or changed.

Preventing unauthorized use of the application
   · This application has a mechanism for performing authentication using both a CID and password.
   · If the CID or password, or both are lost or leaked, the CID can be disabled by the data center.
   · The service can not be used unless the user registers an email address and changes the initial password.
Terminal Security (for Android)

Preventing information leakage

1) User information
   Information on the user and environment used by the application is encrypted and saved inside the application.

2) Application logs
   The log files are stored in the internal storage specific to the application, which cannot be accessed by other applications.

3) Information embedded in the program
   The application is encrypted so that it cannot be disassembled easily in order to mitigate the risks of information leakage.

Preventing program tampering
The application has a tampering detection mechanism. If it is tampered with, the attempt is detected and the application will not start.

Preventing unauthorized use of the application
   • This application has a mechanism for performing authentication using both a CID and password.
   • If the CID or password, or both are lost or leaked, the CID can be disabled by the data center.
   • The service can not be used unless the user registers an email address and changes the initial password.
Terminal Security (UCS for IWB)

Preventing information leakage

1) User information
   Information on the user and environment used by the application is encrypted in IWB and saved in the profile folder of Windows.

2) Application logs
   Application logs are saved in the profile folder of Windows, which cannot be accessed from outside.

3) Information embedded in the program
   The application is encrypted so that it cannot be disassembled easily in order to mitigate the risks of information leakage.

Preventing program tampering
   The application has a tampering detection mechanism. If it is tampered with, the attempt is detected and the application will not start.

Preventing unauthorized use of the application
   - This application has a mechanism for performing authentication using both a CID and password.
   - If the CID or password, or both are lost or leaked, the CID can be disabled by the data center.
   - The service cannot be used unless the user registers an email address and changes the initial password.
   - The CID and password can be entered only in the administrator settings, which is password protected.
   - The password is encrypted and saved in a file on the local disk in IWB.
   - Access to this file is restricted by the Windows group policy. The file can be accessed only by Ricoh’s engineers.