



RAYSYNC FILE TRANSMISSION PRODUCTS
TECHNICAL WHITE PAPER
RAYWING PTE. LTD.

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I. Product overview

Raysync File Acceleration Transmission Product is a professional high-speed file transmission system independently developed by RAYWING PTE. LTD. It can help users quickly distribute TB-class mass files worldwide and has been widely used by hundreds of enterprises in media, film and television production, communication equipment, automobile manufacturing and other industries.

2. Core advantages

2.1 Intelligent Optimization for Network

The independently developed high-speed transmission protocol Raysync can help users to automatically adjust the transmission speed to the optimal state regardless of any network latency or packet loss. It can improve the speed by tens to hundreds of times compared with FTP and Http transmission methods based on TCP.

Support UDP and TCP intelligent handover selection to ensure optimal transmission experience. The system will automatically select TCP for transmission in the LAN environment with low latency and no packet loss. The system will automatically select UDP for transmission in the Internet with high latency and packet loss.

2.2 Intelligent Optimization for Disk I/O

Regardless whether it is transmitting large files or large amounts of small files, the self-developed RayFile file processing engine can achieve the optimal transmission speed with minimum system software overhead.

A single TB file transfer is supported in a large file transmission scenario.

Raysync transmission can easily transmit thousands of files per second through concurrent multithreading, multi-file multiplexing connection and other technologies in the scene of massive small files transmission, and the same can improve the speed by tens to hundreds of times compared with common FTP and Http.

2.3 Multiple Checks Guarantee Reliable File Transmission

- Support breakpoint continuation;
- Support multiple transmission verification mechanisms such as message verification and document integrity verification to ensure that users' documents can be delivered to the destination smoothly;

2.4 Firewall Friendly

Only one TCP port needs to be opened and one UDP port can make the whole transmission system run normally without exposing too many ports in the external network.

2.5 High Safety

Support TLS encryption protocol, users can use self-signed certificates or certificates issued by CA institutions for encryption to ensure file security.

- AES-256 Financial Level Encryption Strength to Protect User Data Privacy Security;
- FTP protocol and data channel have added TLS1.3 security function;
- Support to configure confidential certificates to make service access more secure;

2.6 Supports AD Domain Users

It supports docking with AD domain and directly uses users in AD domain for login and authorization.

2.7 Intelligent Compression

The system supports automatic intelligent compression to help users save valuable bandwidth and speed up the file transfer process.

2.8 Support load balancing deployment to ensure high availability of the system

	Service name	Function Description
Server	Database	Save user information and configuration

		information, etc.;
	Raysync Web service	provide Raysync Web service, It includes user console and administrator console.
	Raysync file service	provide Raysync file transmission end
	Watchdog Monitoring Service	Monitoring of Web services and file services regularly is normal, whether there are exceptions will automatically restore the Web services and file services start.
	AD domain server (optional)	Many enterprises have their own AD domain server, and employees' accounts are stored in AD domain server. Raysync supports docking with AD domain server and direct use of AD domain account.
	Shared storage (optional)	Required in load balancing deployment mode for multiple transmission nodes to share the same storage.
	Load balancer	In the load-balanced deployment mode,

	(optional)	uniform network access is required and automatically distributed to multiple transmission nodes.
Client	browser UI	User login, file operation, external chain Settings and other functions.
	File transmission client	Realize user file upload, download function.

Transmission nodes can be added in a scale-out manner to improve the performance of the transmission system and support up to 10Gbps traffic through load balancing deployment.

2.9 Support multi-path automatic selection

Multi-path communication is supported between Raysync client and server through DNS cooperation, and Raysync client can automatically select the fastest path.

3. Brief Introduction of Congestion Detection and Monitoring Technology

Introduction of Raysync System Service Components;

Raysync transmission system is a system combining B/S and C/S models. It supports single-machine deployment and load balancing multi-machine deployment. Raysync supports both built-in users and AD domain users.

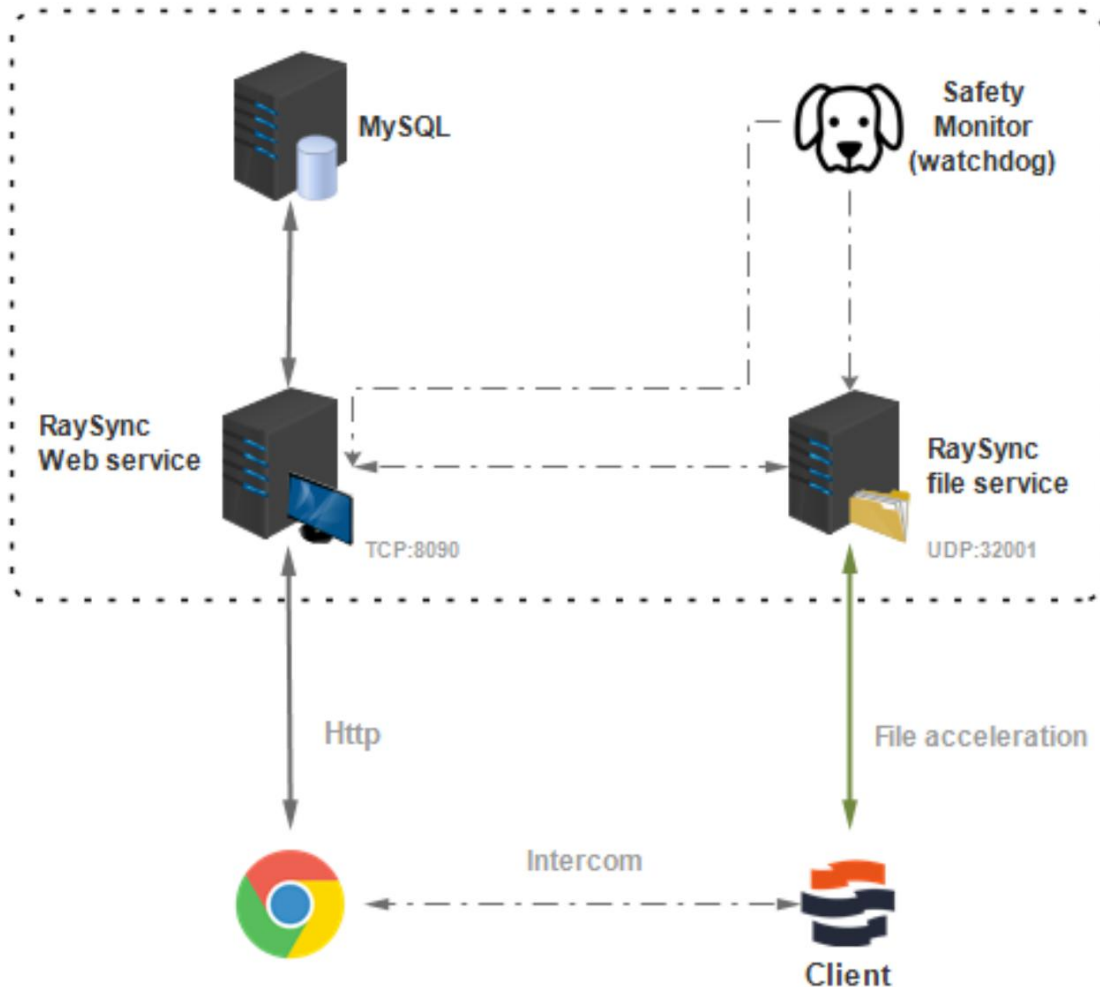
3.1 Single-machine deployment, using built-in users of the system

Database selection: Raysync server supports configuration of SQLite or MySQL database in single-machine deployment mode. It is recommended to use the built-in SQLite for stand-alone deployment when there are no special requirements. The advantage of SQLite database is that it is simple and easy to use without additional installation and configuration of MySQL database.

Storage selection: There are no special requirements for storage, which can be disk storage of the server itself or external shared storage such as NAS.

Advantages: This deployment method is simple in process, and can be started after downloading Raysync server without configuring external database.

Deployment method:

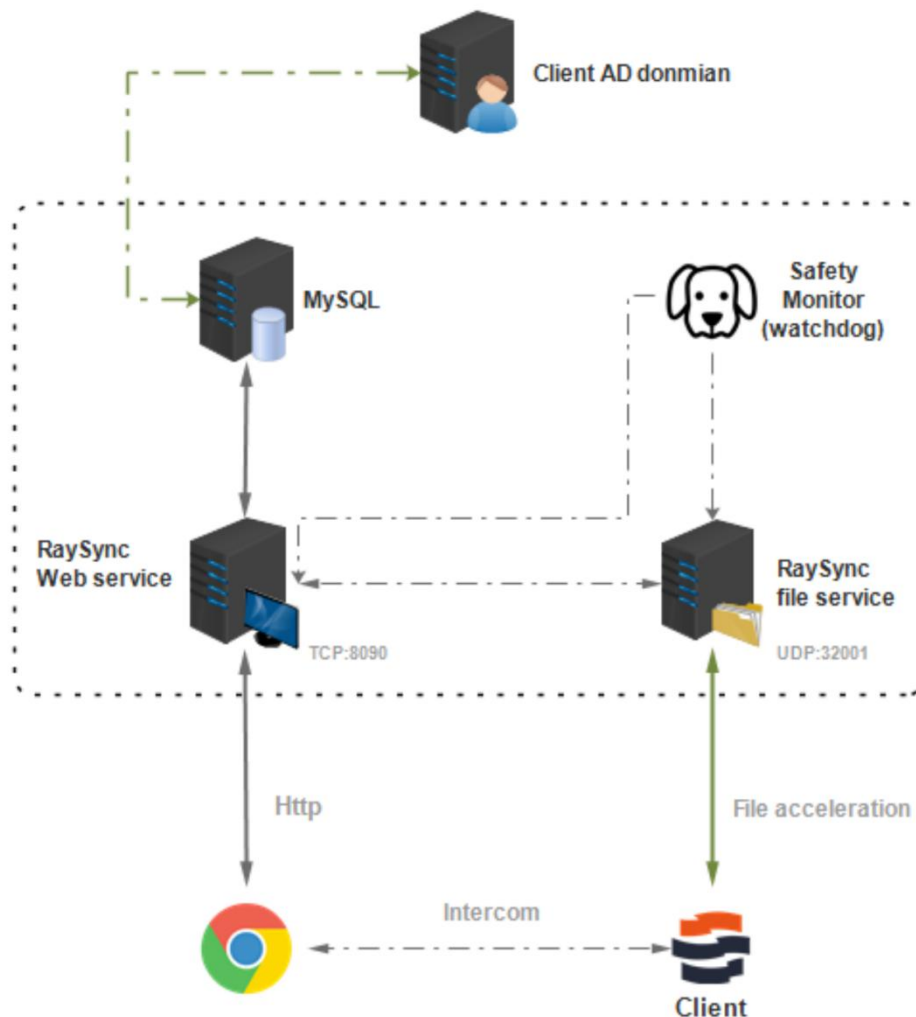


3.2 Stand-alone deployment, using external AD domain users

AD domain docking configuration: log into the administrator console of Raysync server and configure ad domain docking information in the console after installing and starting Raysync.

Database selection: Raysync server supports configuration of SQLite or MySQL database in single-machine deployment mode. It is recommended to use the built-in SQLite for stand-alone deployment when there are no special requirements. The advantage of SQLite database is that it is simple and easy to use without additional installation and configuration of MySQL database.

Storage Selection: There are no special requirements for storage, which can be disk storage of the server itself or external shared storage such as NAS.



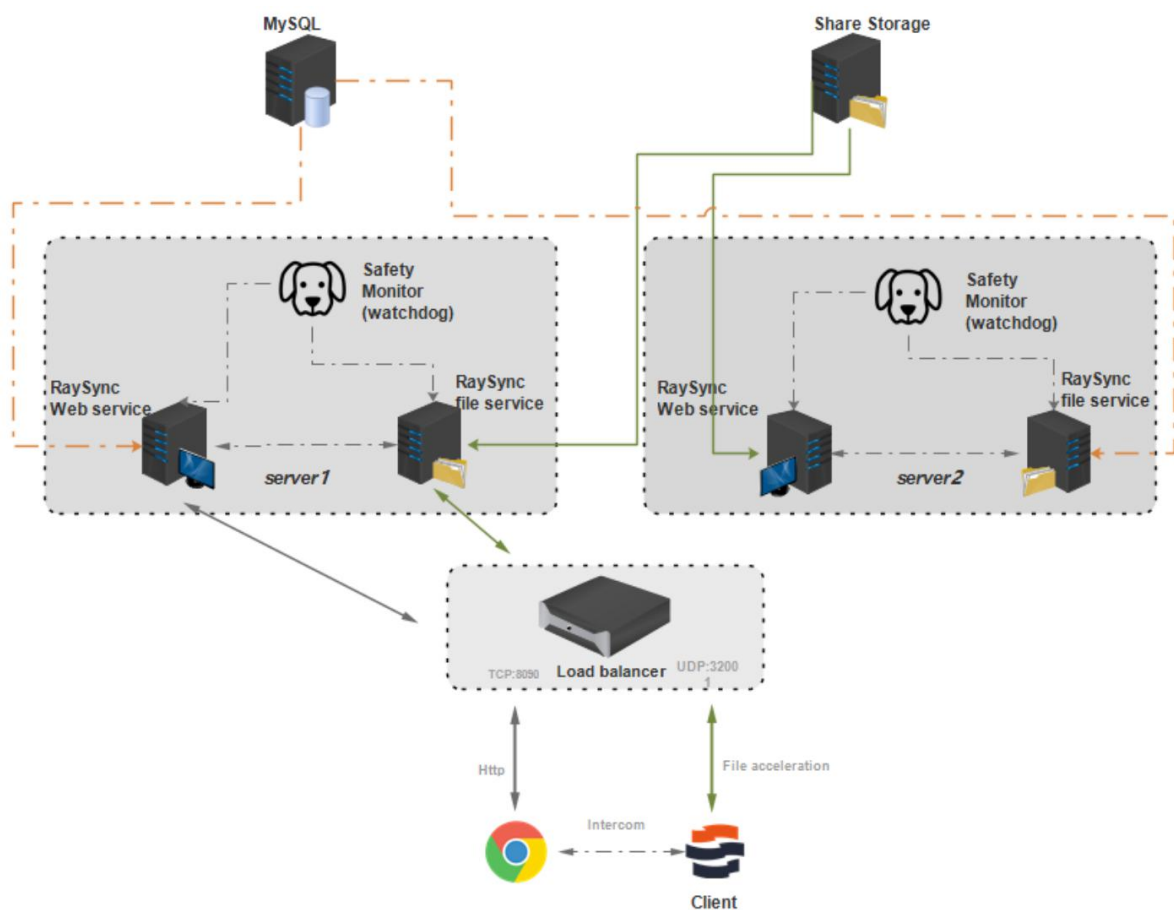
3.3 Load balancing multi-machine deployment, using system built-in users

Database Selection: MySQL database must be used for Raysync servers under load balancing deployment mode.

Storage Selection: External shared storage, such as NAS, must be used, and the mount path of storage must be strictly consistent on each node with balanced load.

Load Balancer Selection: No special requirements, as long as it can support 4-layer UDP distribution and TCP distribution. Open source LVS and commercial F5 load balancers can be supported. Load balancers on clouds such as Aliyun, Huawei and Tencxun.

Note: Amazon AWS load balancer does not support UDP stream distribution and cannot be used together.



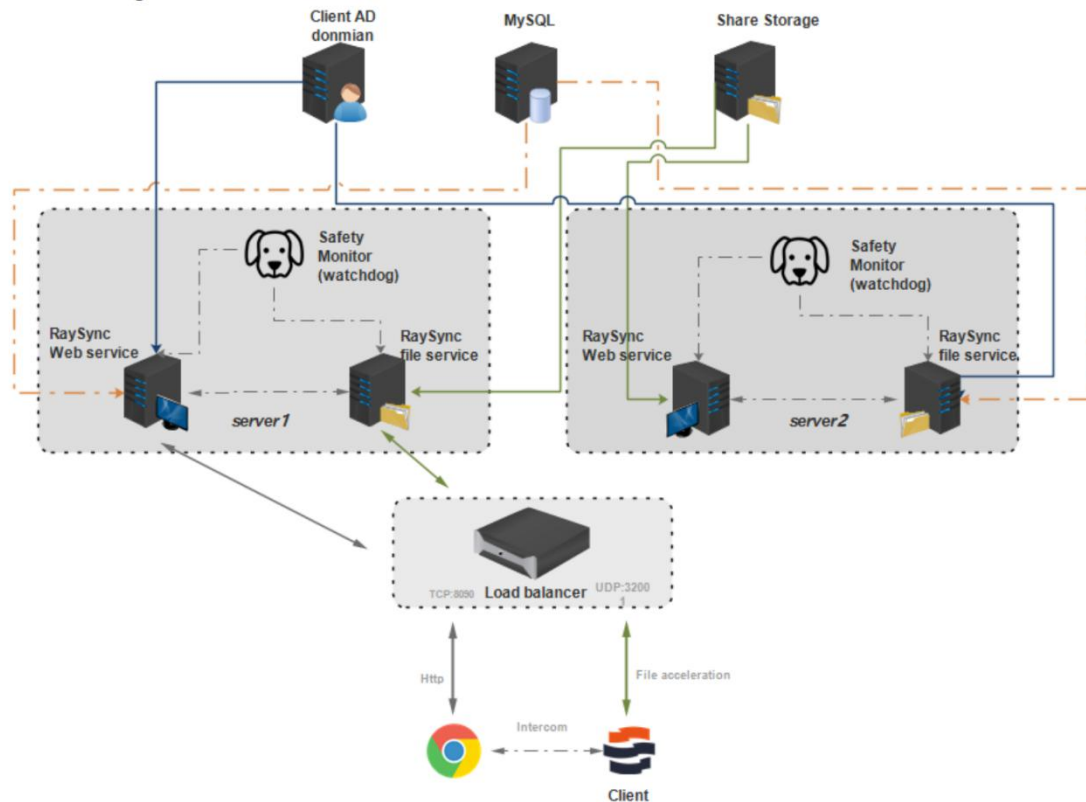
3.4 Load balancing multi-machine deployment, using external ad domain users

Database Selection: MySQL database must be used for Raysync servers under load balancing deployment mode. **Storage Selection:** External shared storage, such as NAS, must be used, and the mount path of storage must be strictly consistent on each node with balanced load.

Storage Selection: External shared storage, such as NAS, must be used, and the mount path of storage must be strictly consistent on each node with balanced load.

Load Balancer Selection: No special requirements, as long as it can support 4-layer UDP distribution and TCP distribution. Open source LVS and commercial F5 load balancers can be supported. Load balancers on clouds such as Aliyun, Huawei and Tencxun.

Note: Amazon AWS load balancer does not support UDP stream distribution and cannot be used together.



4. Introduction of Main Functions of Products

4.1 Main Functions of Client

4.1.1 Upload

- It supports uploading files/folders in multiple languages, such as
- Chinese/English/French/Arabic/German/Spain and other languages;
- Support file upload with TB level size;
- Supports uploading of millions of files in a single folder;
- File/folder upload supporting local path and network path;

- Supports uploading and interconnection of files/folders longer than 255 bytes;

4.1.2 Download

- Supporting the downloading of files/folders in multiple languages, such as
- Chinese/English/French/Arabic/German/Spain and other languages;
- It supports TB-level file download;
- It supports uploading of millions of files in a single folder;
- File/folder upload supporting local path and network path;
- It supports file/folder downloads that exceed 255 bytes in length;

4.1.3 Share Download

- It supports to set the expiration time of sharing links;
- Sharing links that support the generation of secure passwords;

Set link expiration time:

Share to Other Partners

Sharing scope

☒ Anyone with the link
 ☐ Only people in your organization

Allow download

Total download
 Unlimited by default

Set password

Expiration

☐

Show file alias

☐

Email notification

Email the partner with the download link

☐

Download notification

Email me when the partner starts and finishes download

☐

Cancel

Create Link

Generate sharing links:

Share to download

Create successfully!

Link:
 https://[redacted]:8091/share


Password:
 jyMK

Copy Link and Password

Confirm

Visit the sharing link:

Raysync Enterprise



This shared link requires a password

Please enter your access password

Log In

Browse sharing links:

Download			Loaded 1
All			
<input type="checkbox"/> Name	Size	Modified	
<input type="checkbox"/> raysync.png	3.80KB	2023-04-21 17:33:51	

4.1.4 Invitation to Upload

- It supports to set the expiration time of invitation upload link;
- An invitation upload link that supports generating a secure password;

Generate an invitation upload link:

Invite to upload

Inviting your partner to upload files to

Invitation scope

☒ Anyone with the link
 ☐ Only people in your organization

Expiration

Allow to delete

Email notification

Email the partner with the upload link

Upload notification

Email me when the partner starts and finishes upload

Cancel

Create Link

Set the expiration time of the invitation upload link:

Invite to upload

Inviting your partner to upload files to

Invitation scope

☒ Anyone with the link
 ☐ Only people in your organization

Expiration

2024-03-12 15:59:41

1 Day

Allow to delete

Email notification

Email the partner with the upload link

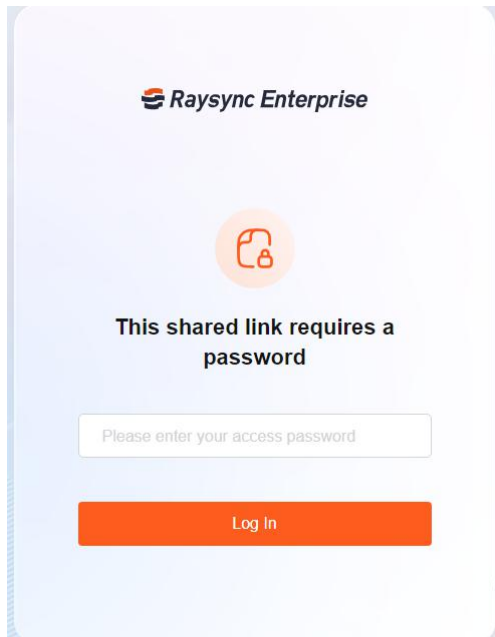
Upload notification

Email me when the partner starts and finishes upload

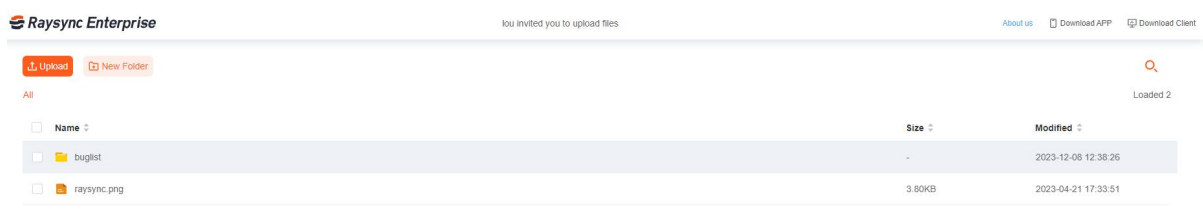
Cancel

Create Link

Visit Invitation Upload Link:



Browse invitation to upload link content:




4.1.5 Data Compression

It supports to start data compression, compress the compressible file format, and accelerate the transmission speed.


Turn on compression:


Transfer Bandwidth Peer to peer Advanced Proxy Default server


Download path ☐ Location



☒ Select the path manually when download

Task parallel Max number of upload tasks 

Max number of download tasks 

Parallel files per task 

UDP packet size (600-1442)

File settings ☒ Enable data compression during transfer

Cancel

Save

4.1.6 Task detail

It supports to view the details of task transmission, and better view the transmitted information when a single task contains a large number of files.

View task list:

Transfer List

Transfer Task

Sync Task

Peer to Peer Task

☐ Select All

|

selected 0 item(s)

☐

↑

folder.zip (1 items)

Completed

158.48MB

Uploaded: 1/1

×

☐

↑

Raysync-Desktop-Client-Windows-6.7.... (1 items)

Stopped

45.25MB/175.71MB

Uploaded: 0/1

×

☐

↑

4GB.mp4.zip (1 items)

Stopped

1001.44MB/4.01GB

Uploaded: 0/1

×

☐

↑

log1 (1 items)

Completed

501.36KB

Uploaded: 1/1

×

☐

↑

folder.zip (1 items)

Completed

158.48MB

Uploaded: 1/1

×

☐

↑

boyun_scripts.zip (1 items)

Completed

4.70MB

Uploaded: 1/1

×

☐

↑

9.1.zip (1 items)

×

Stop All

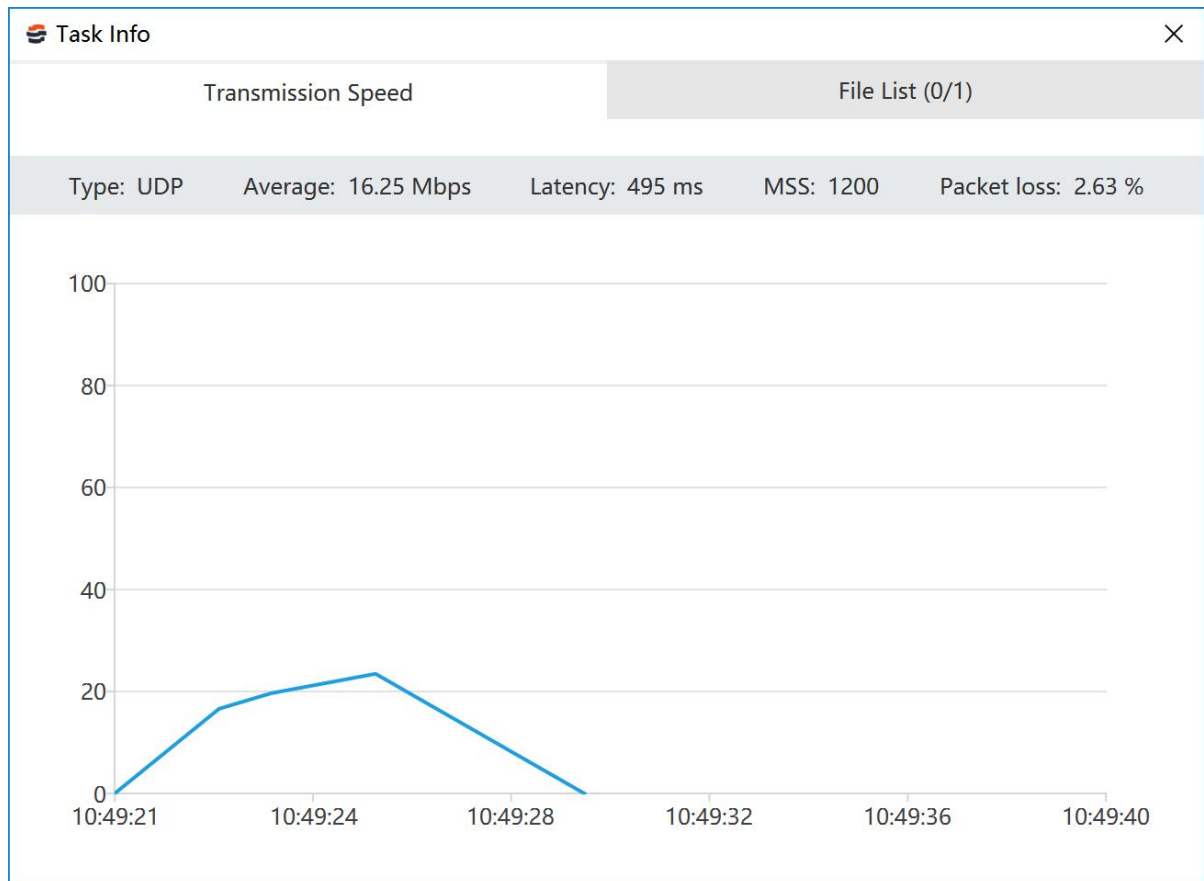
Start All

Delete All

4.1.7 Task Speed Curve

The users can view the task transmission speed curve to better understand the speed change and network bandwidth utilization rate during task transmission.

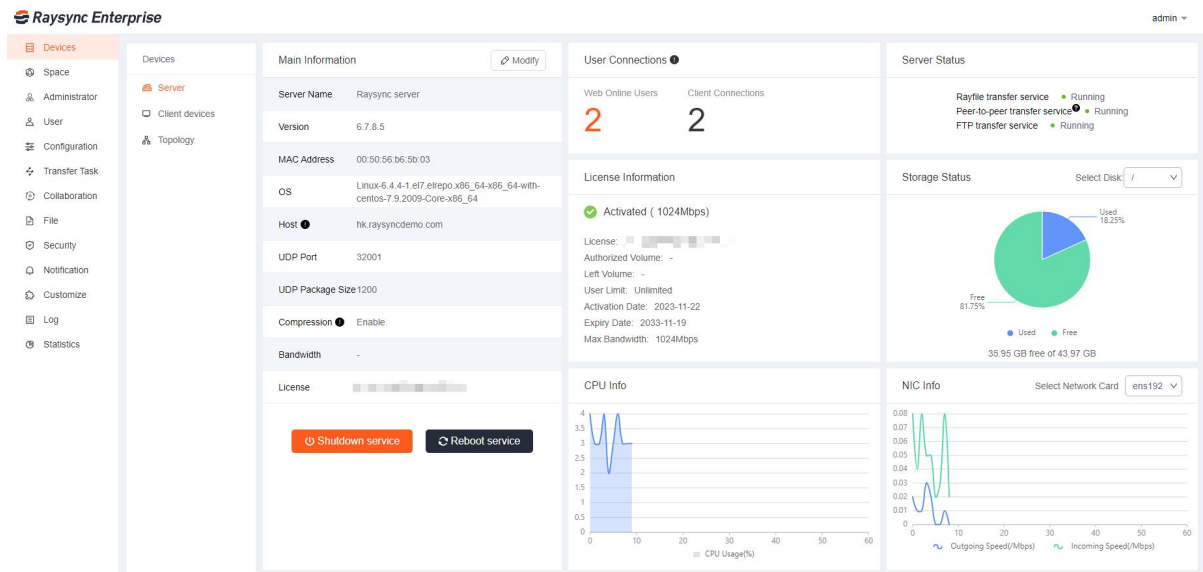
View the speed curve:



4.2 Main Functions of Server

4.2.1 Server Status Monitoring

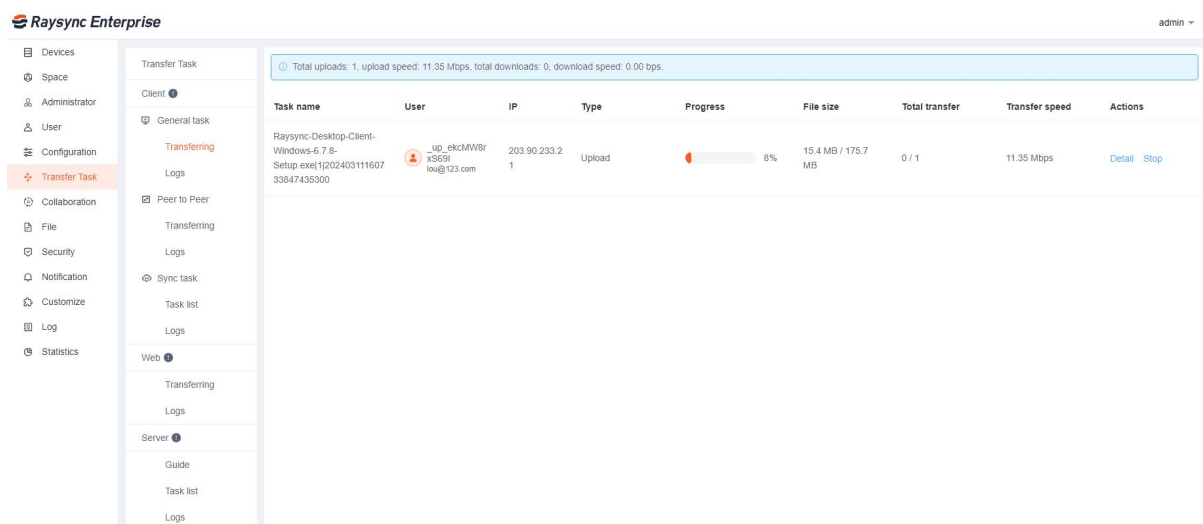
- It supports background viewing of server CPU usage;
- It supports background view of the server's network card gateway bandwidth information;
- It supports background viewing of server disk space;
- It supports background check server online users;



4.2.2 Transmission Status Monitoring

It enables administrators to view the live data being transmitted by the server and the user's transmission history so that the administrators can more conveniently and intuitively monitor the transmission of the server.

Transmission live monitoring:



Transmission History Log View:

Raysync Enterprise admin

Devices
Space
Administrator
User
Configuration
Transfer Task
Collaboration
File
Security
Notification
Customize
Log
Statistics

Transfer Task
Client
General task
Transferring
Logs
Peer to Peer
Transferring
Logs
Sync task
Task list
Logs
Web
Transferring
Logs
Server
Guide
Task list
Logs

Logs

Task name Status User IP Time

Search download Download all

Task name	User	IP	Type	Size	Total transfer	Start time	End time	Average speed	Status	Actions
Raysync-Desktop-Client- Windows-6.7.8- Setup.exe(12 024031116073 3847435300			Upload	175.71 MB	1	2024-03-11 16:07:38,458	2024-03-11 16:08:02,482	17.01 Mbps	Incomplete	View download
raysync-man_cmd.tar(1)gz(1)20240 30712554094 0			download	5.30 MB	1	2024-03-07 18:55:41,941	2024-03-07 18:55:45,945	10.87 Mbps	Completed	View download
raysync-man_cmd.tar(1)gz(1)20240 30717520644 8670600			Upload	5.30 MB	1	2024-03-07 17:52:06,126	2024-03-07 17:52:12,132	7.55 Mbps	Completed	View download

4.2.3 Encrypted transmission

It supports encrypted transmission, ensures transmission security on the basis of fast transmission, and can configure user self-signed certificates.

Turn on encrypted transmission:

Raysync Enterprise

Devices
Space
Administrator
User
Configuration
Configuration
Transfer Task
Collaboration
File
Security
Notification
Customize
Log
Statistics

Configuration
Basic configuration
Email configuration
Client app
More
Transfer
Transfer
Sync
Peer-to-peer
Link
Share
More configurations
MySQL configuration
Event settings
Log

Client app

☐ Force enable Hash check

☒ Force enable Encrypted transfer

☐ Force enable rsync verification

☐ Force disable

Configure URL (When the user has installed multiple client versions, this config can be used to connect to specify the version of the client)

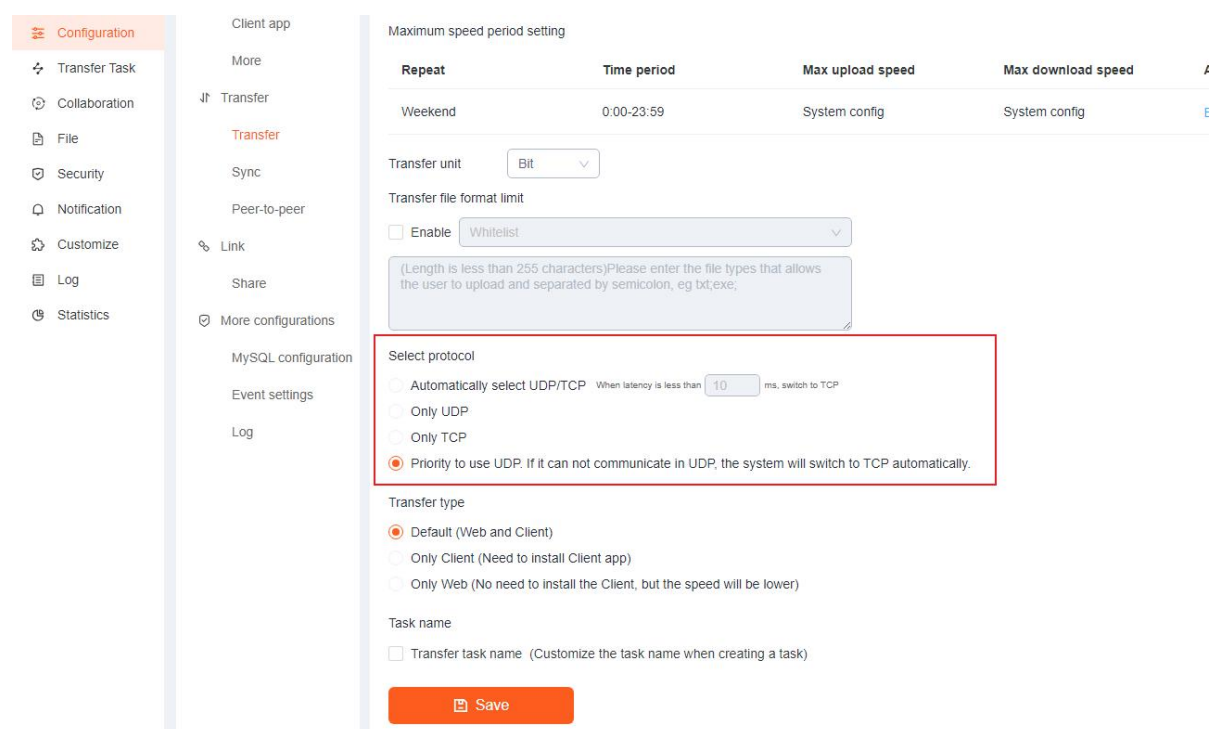
raysync://

Save

4.2.4 TCP/UDP transmission mode automatic switching

TCP/UDP transmission mode switching is supported to meet the transmission requirements of enterprise users in different network environments.

Raysync defaults to UDP transmission, but TCP transmission configuration is provided to make greater use of intranet bandwidth during intranet deployment:



The screenshot displays the 'Configuration' page in the Raysync web interface. The left sidebar contains navigation links: Configuration, Transfer Task, Collaboration, File, Security, Notification, Customize, Log, and Statistics. The main content area is divided into two columns. The left column lists various settings: Client app, More, Transfer, Sync, Peer-to-peer, Link, Share, More configurations, MySQL configuration, Event settings, and Log. The right column shows the 'Maximum speed period setting' table, which has columns for Repeat, Time period, Max upload speed, and Max download speed. Below this table, there are settings for Transfer unit (Bit), Transfer file format limit (Whitelist), and a 'Select protocol' section. The 'Select protocol' section is highlighted with a red box and contains four radio button options: 'Automatically select UDP/TCP' (selected), 'Only UDP', 'Only TCP', and 'Priority to use UDP'. Below this, there is a 'Transfer type' section with three radio button options: 'Default (Web and Client)' (selected), 'Only Client (Need to install Client app)', and 'Only Web (No need to install the Client, but the speed will be lower)'. At the bottom, there is a 'Task name' section with a checkbox for 'Transfer task name' and a 'Save' button.

Repeat	Time period	Max upload speed	Max download speed
Weekend	0:00-23:59	System config	System config

Transfer unit: Bit

Transfer file format limit: Enable Whitelist

(Length is less than 255 characters)Please enter the file types that allows the user to upload and separated by semicolon, eg txt;exe;

Select protocol

- ☒ Automatically select UDP/TCP When latency is less than 10 ms, switch to TCP
- ☐ Only UDP
- ☐ Only TCP
- ☐ Priority to use UDP. If it can not communicate in UDP, the system will switch to TCP automatically.

Transfer type

- ☒ Default (Web and Client)
- ☐ Only Client (Need to install Client app)
- ☐ Only Web (No need to install the Client, but the speed will be lower)

Task name

☐ Transfer task name (Customize the task name when creating a task)

Save

4.2.5 User Rights Management

It supports the flexible management of individual users' permissions such as uploading/downloading/deleting/renaming/creating folders to meet the needs of enterprise management.

Administrator

User

Configuration

Transfer Task

Collaboration

File

Security

Notification

Customize

Log

Statistics

General settings

Storage settings

Transfer settings

Other settings

The following configuration is only for the default space. If you need to modify the storage settings of other spaces, please go to [Space] - [Member] to configure.

Home Directory

Default

Virtual Directory

Add

Storage

Maximum storage 1 GB

Forbidden path

Please enter the relative path that are forbidden for users to access, support wildcard characters, separated by semicolons;

Allowed access path

Please enter the relative paths that users are allowed to access, separated by semicolons;

Permissions

Default Select all Reverse all

<input checked="" type="checkbox"/> List files	<input checked="" type="checkbox"/> Upload file	<input checked="" type="checkbox"/> Download file
<input checked="" type="checkbox"/> Rename	<input checked="" type="checkbox"/> Sync folder	<input checked="" type="checkbox"/> Create directory
<input checked="" type="checkbox"/> Delete	<input checked="" type="checkbox"/> Share	<input checked="" type="checkbox"/> Invite
<input checked="" type="checkbox"/> Copy	<input checked="" type="checkbox"/> Move	

Save

Personalization settings:

Raysync Enterprise

admin

Devices

Space

Administrator

User

Configuration

Transfer Task

Collaboration

File

Security

Notification

Customize

Log

Statistics

Customize

Logo & icon

A Keywords


User Portal Menu

Logo & icon

Shortcut icon: Upload

(Support icon with a maximum size of 64x64 pixels. The shortcut icon is displayed in the browser address bar of the User Portal.)

No image

Display:  + <https://www.>

Logo: Upload

(Support jpg/png/gif with a maximum size of 160x70 pixels. The logo is displayed on the User Portal and admin console.)

No image

Background image: Upload

(Support jpg/png with a maximum size of 1020x1080 pixels. The image is displayed as the background behind the User Portal login page.)

No image


Background color: (Select color as the background behind the User Portal login page)


Button color: (Select buttons color on the User Portal)

Screen position: (Select the screen position where you want login box to be played on the end-user portal)

Raysync Enterprise

Login Raysync Enterprise



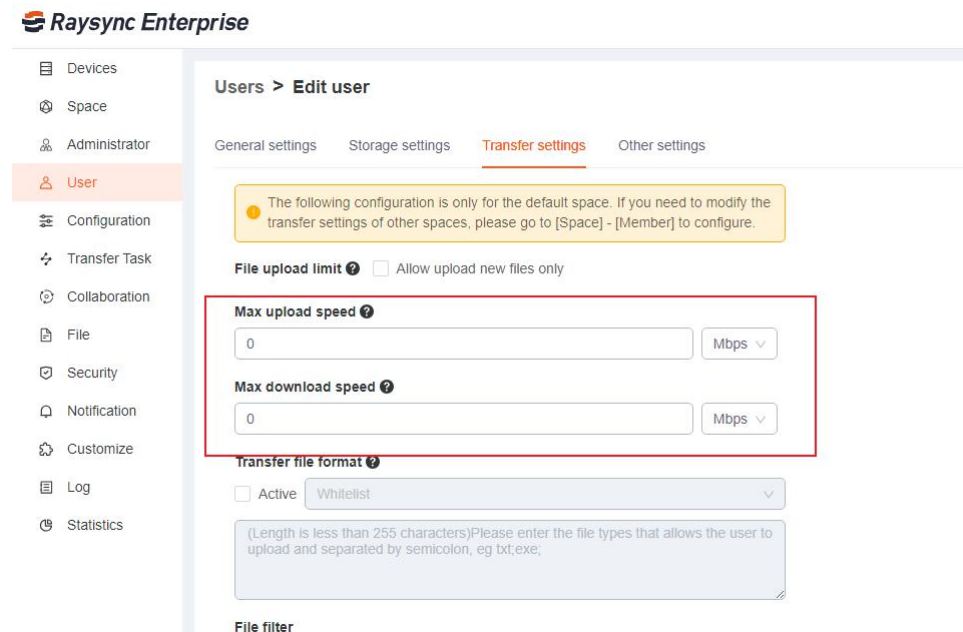


Log in

4.2.6 User Speed Limit

It supports to configure user transmission speed and balance management server bandwidth.

User speed limit:



Raysync Enterprise

Users > Edit user

General settings Storage settings **Transfer settings** Other settings

The following configuration is only for the default space. If you need to modify the transfer settings of other spaces, please go to [Space] - [Member] to configure.

File upload limit ☐ Allow upload new files only

Max upload speed Mbps

Max download speed Mbps

Transfer file format ☐ Active Whitelist

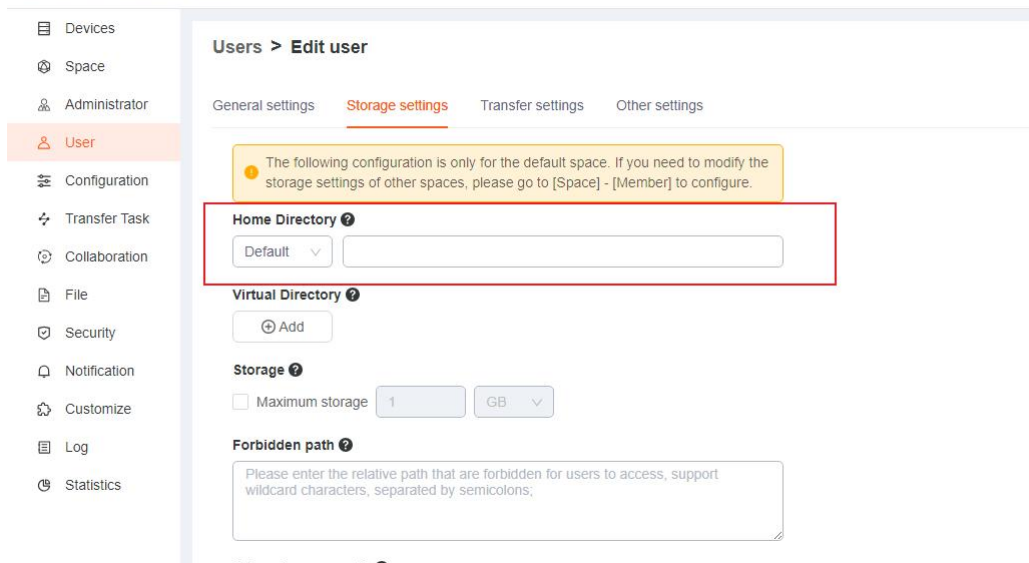
(Length is less than 255 characters) Please enter the file types that allows the user to upload and separated by semicolon, eg txt;exe;

File filter

4.2.7 User Home Directory Configuration

It supports configuration of user home directory, flexible management of user's server home directory location

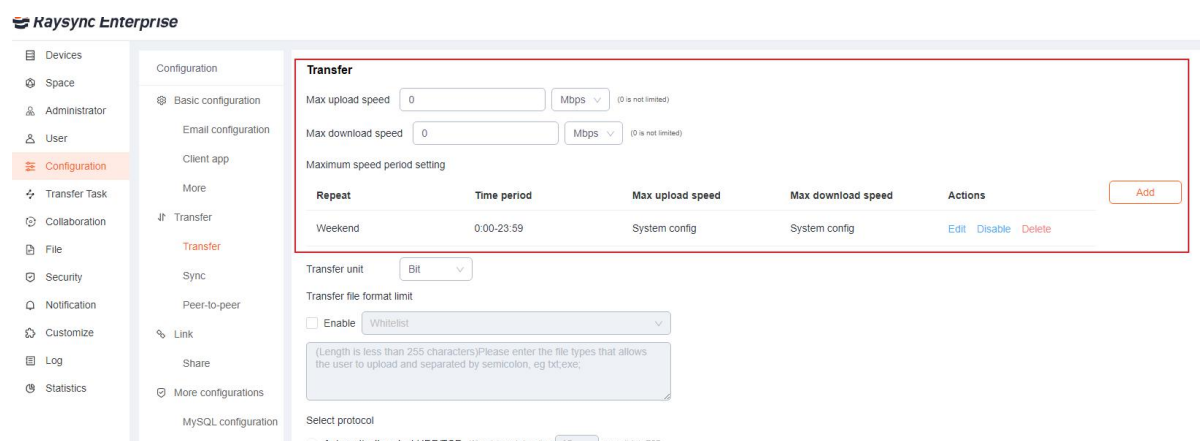
To configure the user home directory:



4.2.8 Server Speed Limit

It supports the global speed limit of the server, and avoids the fussiness when the speed limit is required for multiple users.

Global speed limit:



4.2.9 External Database Configuration

It supports external databases to provide more convenient and flexible database configuration methods for enterprise deployment.

Enable external database:

Raysync Enterprise

- Devices
- Space
- Administrator
- User
- Configuration**
- Transfer Task
- Collaboration
- File
- Security
- Notification
- Customize
- Log
- Statistics

Configuration

- Basic configuration
- Email configuration
- Client app
- More
- Transfer
- Transfer
- Sync
- Peer-to-peer
- Link
- Share
- More configurations
- MySQL configuration**
- Event settings
- Log

MySQL configuration

☐ Enable external MySQL database

* Database address

* Database port

* Database name

* Database account

* MySQL password

Note: Click the test button after confirming that the information is correct.

4.2.10 Encryption Certificate Configuration

It supports to configure confidential certificates to make service access more secure.

Configure an encryption certificate:

Raysync Enterprise

- Devices
- Space
- Administrator
- User
- Configuration
- Transfer Task
- Collaboration
- File
- Security**
- Notification
- Customize
- Log
- Statistics

Security

- Antivirus
- Access restriction
- Watermark
- Login Password
- Sensitive words
- Certificate**

Certificate

TLS certificate Client TLS

SSL Pem

SSL Key

Certificate Validity 2023-07-13 2024-07-13

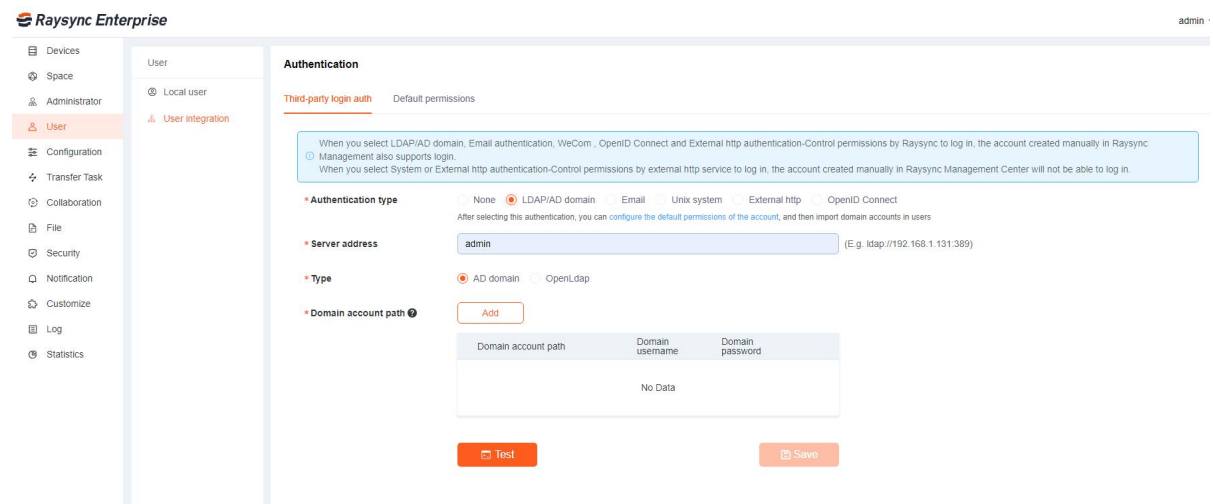
Domain Name hk.raysyncdemo.com

Security ☐ Prohibit non-SSL connections

4.2.11 Third-party users integration

Support configuration integration for third-party users to provide users with better import

The original user system of the enterprise.



Raysync Enterprise admin

- Devices
- Space
- Administrator
- User**
 - User
 - User integration
- Configuration
- Transfer Task
- Collaboration
- File
- Security
- Notification
- Customize
- Log
- Statistics

User

Local user

User integration

Authentication

Third-party login auth

Default permissions

When you select LDAP/AD domain, Email authentication, WeCom, OpenID Connect and External http authentication-Control permissions by Raysync to log in, the account created manually in Raysync Management also supports login.
When you select System or External http authentication-Control permissions by external http service to log in, the account created manually in Raysync Management Center will not be able to log in.

Authentication type

☐ None
 ☒ LDAP/AD domain
 ☐ Email
 ☐ Unix system
 ☐ External http
 ☐ OpenID Connect

After selecting this authentication, you can [configure the default permissions of the account](#), and then import domain accounts in users

Server address

admin (E.g. ldap://192.168.1.131:389)

Type

☒ AD domain
 ☐ OpenLdap

Domain account path

[Add](#)

Domain account path	Domain username	Domain password
No Data		

Test

Save