



Quick Guide

CDC.NET SOFTWARE V2.0.2

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Technical Assistance

If you have any question and can't find the answer in this manual, please contact SinoGNSS technical support through email: support@comnavtech.com or Skype: *comnav.support*. Your feedback about this Guide will help us to improve it with future revisions. Please email your comments to: support@comnavtech.com

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1. Introduction

This Quick Guide consists of software installation, setting up and functionalities of CDC.NET software, which help you get started with easy. We highly recommended you read this guide before your applications.

Compared with the previous version, this manual has updated the functions including displaying the difference between the base station accuracy display and the PPP¹ result in station page, ionospheric² curve/map, tropospheric³ curve, base station offset curve, coordinate system conversion system, base station quality QC, base station statistics and rover statistics and other functions.

Among these new functions, displaying the difference between the base station accuracy display and the PPP result in station page, the ionospheric map/curve, the troposphere curve, the base station offset curve, and the introduction of SSR precision ephemeris require the client server to be able to connect to the external network port or open the corresponding rules in the firewall.

1.1 Overview

The main software CDC.NET is the CORS Server software, which can check information about all tracked satellites, collect raw observation data from connected stations, produce correction parameters. It is usually installed in a server PC with a static IP address. With this server software, system supervisors can control all receivers at the stations and entire network, for instance:

- Log in to the server from remote locations
- Inspect the operation of the receivers and the network
- Change configurations, operating modes etc.

1.2 Software Interface

The screenshot displays the CDC.NET software interface. On the left is a navigation sidebar with icons for Station, Service, User, Map, System, and Statistics. The main window contains a table with columns: Station, ID, Name, IP, Format, Status, Week, Second, Delay, Epoch, B, L, H, Precision(N), Precision(E), and Property. The table lists various stations (A31C02015 to A31C02034) with their respective details. A status bar at the bottom shows 'InNet/TotalCount: 23/27' and a message box with system logs.

Station	ID	Name	IP	Format	Status	Week	Second	Delay	Epoch	B	L	H	Precision(N)	Precision(E)	Property	Value
A31C02015	2	A31C02016	rtk.sinogn...	RTCM32	In net	2295	206635	0.169	120	30°34'18.2892"	119°31'36.0292"	78.0102	-3.56	10.41	Name	A31C02018
A31C02016	3	A31C02014	rtk.sinogn...	RTCM32	In net	2295	206635	0.063	120	31°21'53.7424"	119°34'14.1471"	17.5180	91.25	65.56	Protocol	NTRIP
A31C02017	4	A31C02022	rtk.sinogn...	RTCM32	In net	2295	206635	0.036	120	31°14.6684"	119°43'46.5864"	170.4445	-2.77	8.62	IP	rtk.sinognss.com
A31C02018	5	A31C02026	rtk.sinogn...	RTCM32	In net	2295	206635	0.050	120	30°47'42.6424"	119°46'2.7661"	25.9384	-3.57	10.38	PORT	8888
A31C02019	6	A31C02025	rtk.sinogn...	RTCM32	In net	2295	206635	0.046	120	31°20'26.0185"	119°47'59.6134"	33.4581	-3.70	9.66	B	31°19'32.7248"
A31C02020	7	A31C02029	rtk.sinogn...	RTCM32	In net	2295	206635	0.098	120	31°49'53.2779"	119°44'55.8644"	70.8960	-3.71	8.86	L	120°25'42.5134"
A31C02021	8	A31C02024	rtk.sinogn...	RTCM32	In net	2295	206635	0.102	120	30°33'30.2060"	119°57'34.5979"	52.9241	-3.55	10.69	H	42.4272
A31C02022	9	A31C02023	rtk.sinogn...	RTCM32	In net	2295	206635	0.181	120	30°42'43.6648"	120°22'21.8200"	35.8705	-4.32	9.91	Format	RTCM32
A31C02023	10	A31C02093	rtk.sinogn...	RTCM32	In net	2295	206635	0.090	120	30°54'1.2148"	120°5'6.4152"	51.9317	-3.56	10.34	RecType	SINOGNSS
A31C02024	12	A31C02029	rtk.sinogn...	RTCM32	In net	2295	206635	0.148	120	30°45'22.6709"	120°19'56.3812"	23.2997	-3.87	10.31	RecCode	
A31C02025	13	A31C02027	rtk.sinogn...	RTCM32	In net	2295	206635	0.351	120	30°51'52.8448"	120°25'19.1780"	29.0290	-3.47	10.13		
A31C02026	14	A31C02018	rtk.sinogn...	RTCM32	In net	2295	206635	0.150	120	31°19'32.7248"	120°25'42.5134"	42.4272	-3.78	9.29		
A31C02027	15	A31C02196	rtk.sinogn...	RTCM32	Offline					30°37'29.4899"	120°45'52.1376"	30.2459				
A31C02028	16	A31C02182	rtk.sinogn...	RTCM32	In net	2295	206635	0.016	120	30°57'52.4526"	120°48'24.8245"	28.2776	-4.04	9.64		
A31C02029	17	A31C02035	rtk.sinogn...	RTCM32	Offline					31°27'46.8847"	120°53'22.8280"	25.4676				
A31C02030	18	A31C02021	rtk.sinogn...	RTCM32	In net	2295	206635	0.170	120	31°10'51.0558"	121°34'5.8234"	27.9784	-3.91	9.30		
A31C02031	19	A31C02021	rtk.sinogn...	RTCM32	In net	2295	206635	0.087	120	30°59'24.3952"	121°11'57.9487"	24.8684	-4.24	9.42		
A31C02032	20	A31C02117	rtk.sinogn...	RTCM32	In net	2295	206635	0.175	120	31°35'25.2858"	121°12'19.8615"	29.4537	-3.90	8.83		
A31C02033	21	A31C02028	rtk.sinogn...	RTCM32	In net	2295	206635	0.158	120	31°21'0.3120"	121°17'33.2137"	36.4144	-4.04	9.24		
A31C02034	22	A31C02284	rtk.sinogn...	RTCM32	In net	2295	206635	0.000	120	30°44'14.1312"	121°17'36.0444"	42.6793	-4.05	9.72		
A31C02035	24	A31C02067	rtk.sinogn...	RTCM32	In net	2295	206635	0.042	120	31°9'54.2991"	121°23'32.4074"	80.1814	-5.04	9.18		
A31C02036	25	A31C02105	rtk.sinogn...	RTCM32	Offline					30°52'43.6426"	121°13'38.9187"	38.0929				
A31C02037	26	A31C02068	rtk.sinogn...	RTCM32	In net	2295	206635	0.206	120	31°13'34.9568"	121°38'43.4032"	38.8223	-3.78	8.82		
A31C02038	27	A31C02034	rtk.sinogn...	RTCM32	Out net	2295	206635	0.029	120	31°31'25.1580"	121°39'55.5023"	25.0826	-26616.42	-14625.14		

2024-01-02 17:21:00: A31C02034 coordinate is wrong and out of net
 2024-01-02 17:20:50: A31C02086 join net
 2024-01-02 17:20:49: Base station A31C02086 receive data
 2024-01-02 17:20:49: Base station A31C02086 online
 2024-01-02 17:18:36: A31C02034 join net
 2024-01-02 17:18:12: A31C02086 connect is wrong and out of net
 2024-01-02 17:18:01: Base station A31C02086 offline
 2024-01-02 17:18:01: Base station A31C02086 offline

The main page of software contains four sections: menu bar, view area, navigation area and a message box. The detailed functions will be demonstrated in following chapters.

- Menu bar: settings for reference stations, service, user and map.
- View area: displays information that you select in the navigation area.
- Message box: shows all messages related to the system operation, including connect/disconnect stations, network status, and users log in/log out.
- The Navigation area: click on the corresponding icons to check stations, service, user and map.

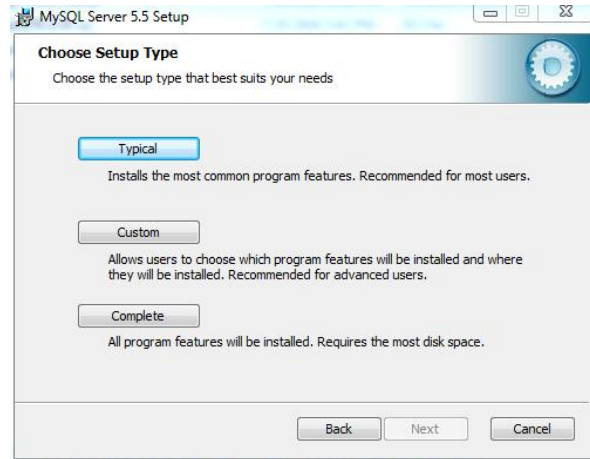
2. Installation

This chapter introduces installation procedures of plug-in programs, MySQL, as well as, CDC+ and CDC.NET main program.

2.1 MySQL Database

MySQL is an open source database management system.

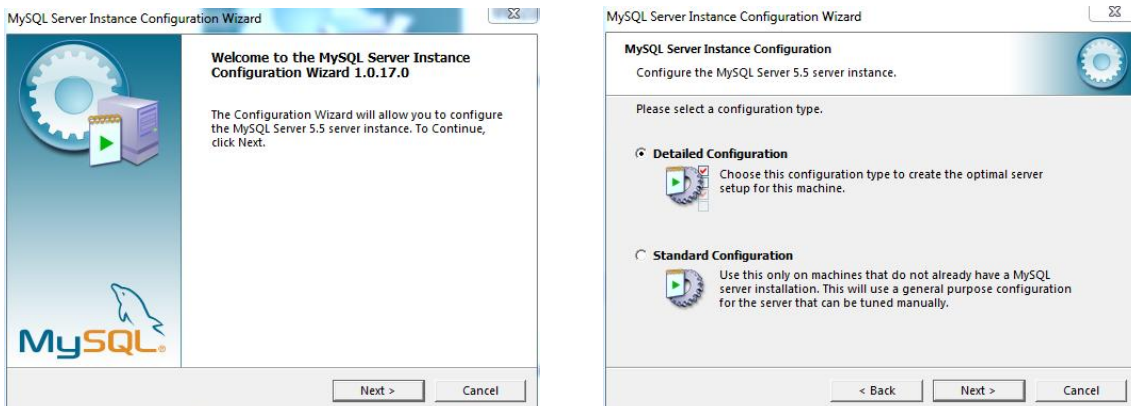
- 1) Double click on **MySQL Server 5.5** -> select **typical** setup.



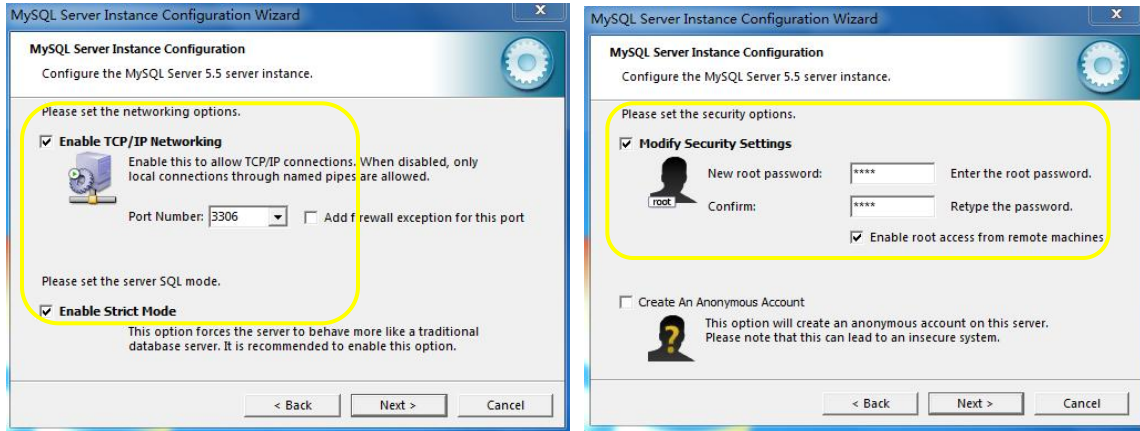
2) Click **Next** until finish the MySQL Server 5.5 Setup Wizard.



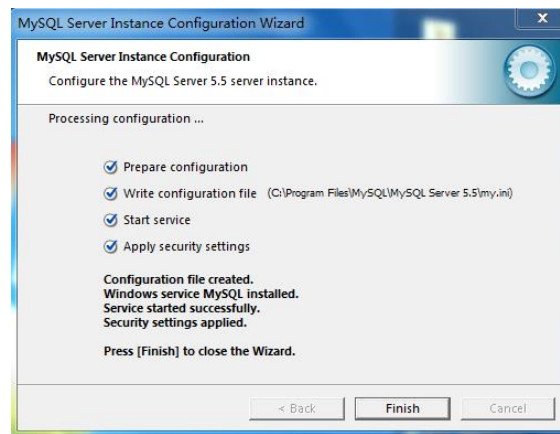
3) Continue to MySQL Server Instance Configuration -> Detailed Configuration



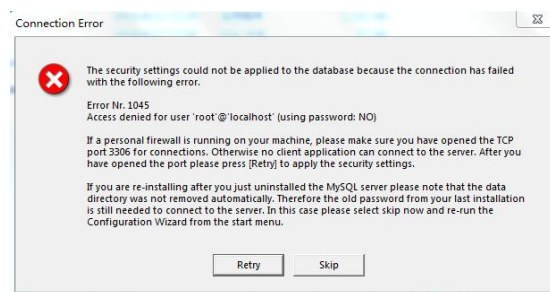
4) Keep default settings until the following figures: Port number: 3306, new root password: 1234.



5) Click **Finish** MySQL Server instance configuration Wizard



Tip: you may occur connection error if you installed MySQL before as the figure below:

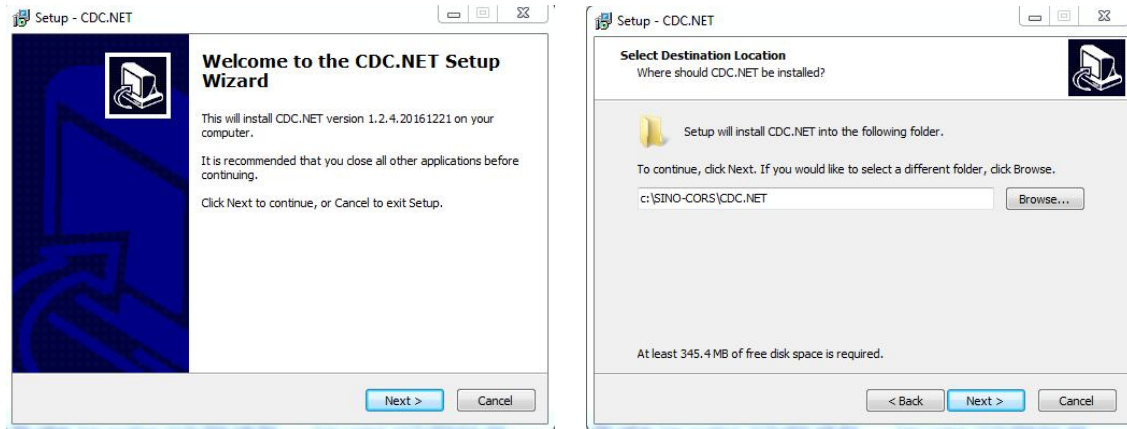


you'd better to: 1) Uninstall MySQL in control panel; 2) delete MySQL folder in *C:\Program Files*; 3) delete MySQL folder in *C:\ProgramData\MySQL* (go to hidden file if you cannot find MySQL folder).

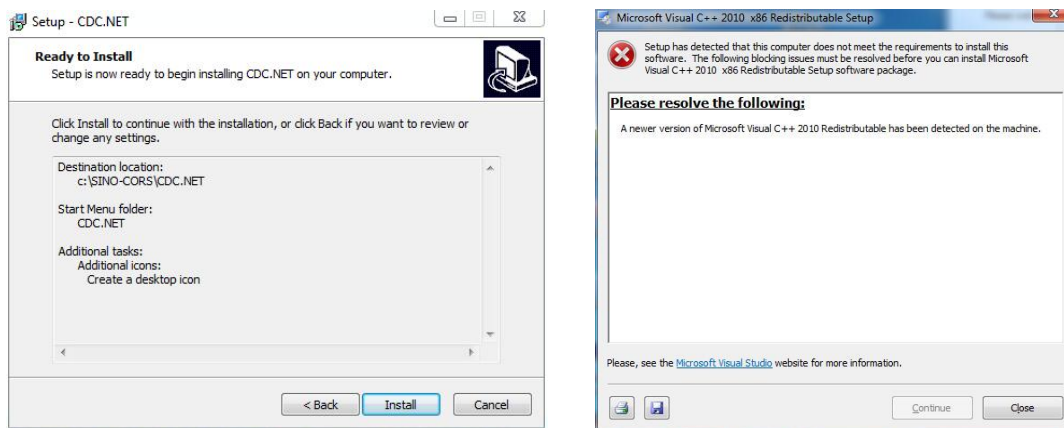
2.2 CDC.NET

After the above plug-in programs installation, you can run CDC.NET software.

1) Double click-on **CDC.NET.exe** -> select proper saving path.

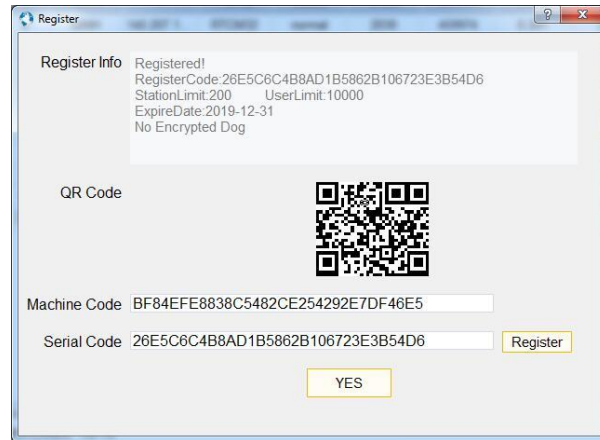


2) Click Install -> Next -> Install Microsoft Visual C++ 2010 x86 Redistributable and Microsoft Visual C++ 2012 x86 Redistributable. If your computer already installed Microsoft Visual C++ 2010/ 2012 x86 Redistributable. Please just close it.



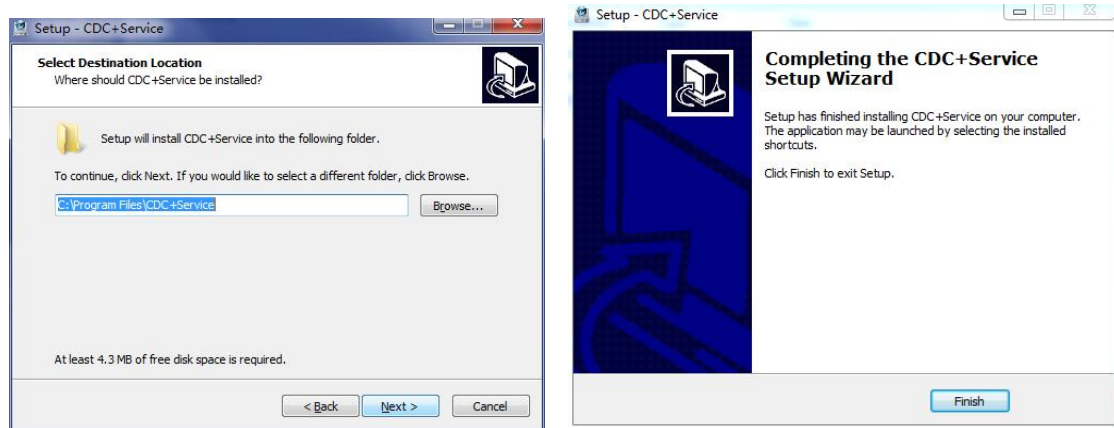
3) Go to **Start-> register**

After enter the serial number, click Register.

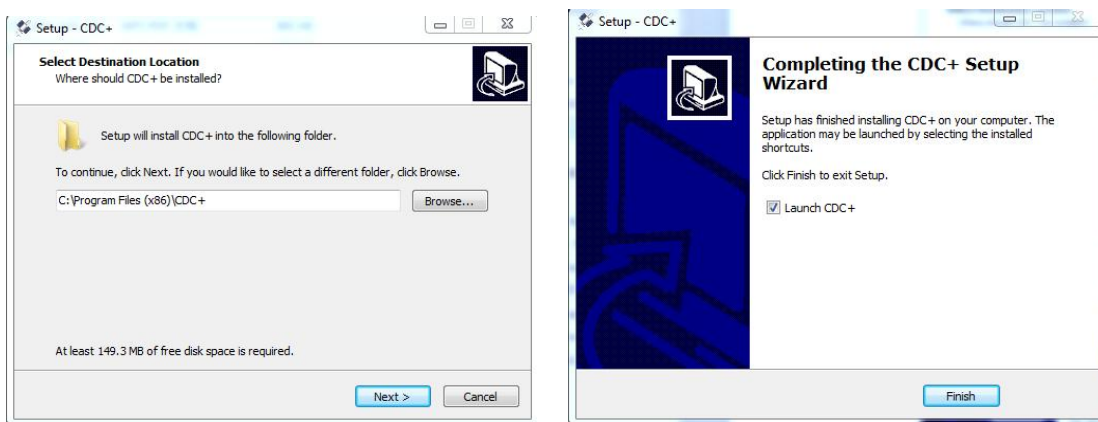


2.3 CDC+

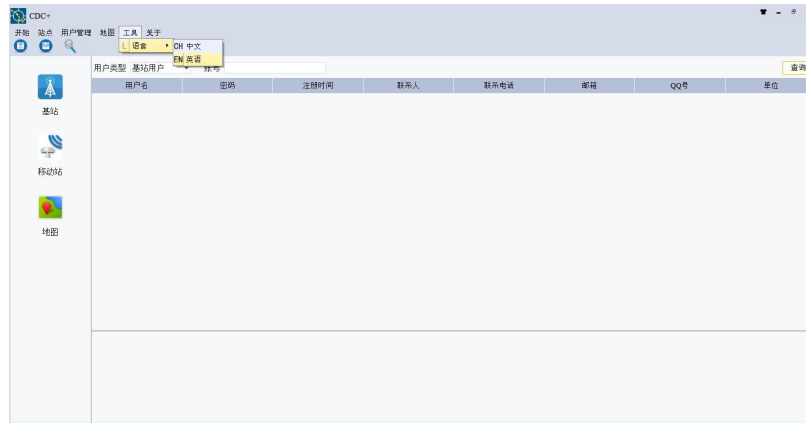
1) Double click on **CDC+Service1.1.0-setup.exe** -> select proper saving path ->Next->Finish.



2) Double click on **CDC+1.1.0-setup.exe** -> select proper saving path -> **Next** -> **Install** -> **Finish**.



3) Change language as English.



3. Setting up CORS software

3.1 guidelines

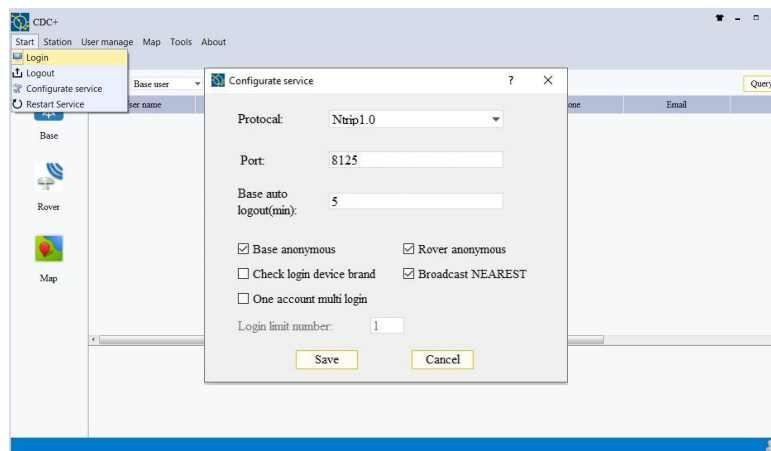
After installing all above software, ComNav CORS service software is mainly required three steps to get started:

- Configure proper Login and protocol settings in CDC+ software;
- Ensure a smooth data communication between reference stations and CDC+ software through Ntrip protocol;
- Configurations in CDC.NET software.

Detailed procedures are described below:

3.2 CDC+ Configuration

1) Go to **Start -> Login**, the CDC+ will login automatically.



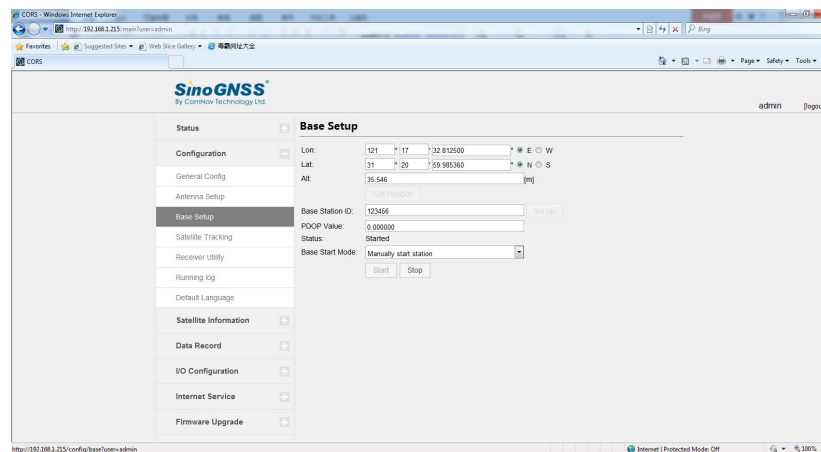
2) Go to **Configure service** -> set Ntrip 1.0 protocol, port: 8125 5 Base auto logout time.

Tip: Check the Base and Rover anonymous to ensure this server is no limitation to any users.

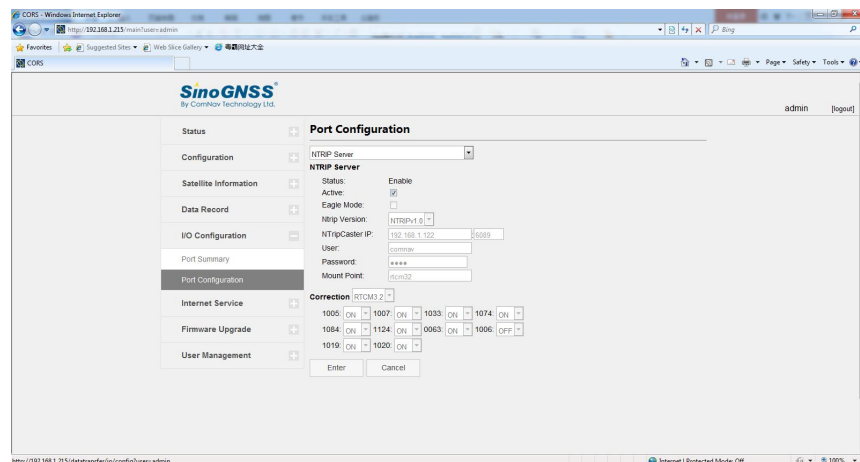
3.3 Reference Station Configuration

Your CORS are required to work in the Base mode, transferring out correction through Ntrip protocol. The following configuration we set is example of SinoGNSS M300Pro, you also can use receivers from other brands.

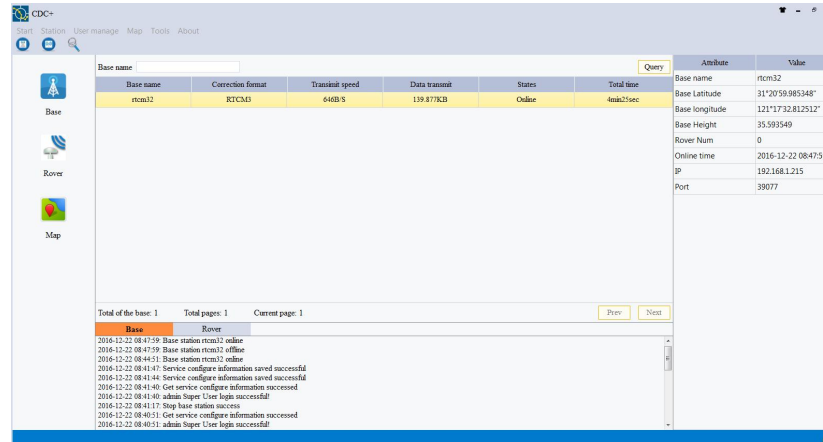
1) Go to **Base Setup** -> enter its coordinates -> click **start**.



2) Go to Port configuration -> in order to change port settings, first uncheck Active and click Enter -> select Ntrip Server, enter IP and port, mount point -> any User and password due to anonymous mode set before -> Select correction messages -> click Enter.



3) Go back to CDC+ software, you can check that the base has already been listed here.



3.4 CDC.NET Configuration

3.4.1 Add station

To connect reference stations with CDC.NET Software successfully, you should obey specific transfer protocol. Commonly, NTRIP is applied with RTCM3.X data type, and TCP/IP can be suitable for raw observation data from a wide range of brands, such as Leica, Trimble, NovAtel, ComNav and more. The following part introduces inputting GNSS observation data through Ntrip protocol.

1) Click **Station** in menu bar -> **add station** -> enter information of the Base, Coordinate, Protocol, Format, IP, Port and MountPoint/UserName/Password (only format choose NTRIP need to input) -> **Add**.

- **Protocol:** contains NTRIP, TCP/IP and TCP SERVER.
- **Format:** contains RTCM32, RTCM31, RTCM23, COMNAV, SOUTH, BINEX and RT27.
- **Ntrip:** After selecting the Ntrip protocol and entering the IP and port, click the Ntrip button to obtain the source list. Users can select their own mountpoints from the obtained source list. If a base station mount point in the source list has been added in CDC.NET, click the Ntrip button, and the mount point will no longer be found in the current source list. Similarly, delete a base mountpoint in CDC.NET, after restarting the service, click Ntrip button, and you can find this mountpoint in the list.
- **Antenna:** Whether the antenna type is selected is determined according to whether the input coordinates include the antenna height. If the input coordinates already include the antenna height, you do not need to select it. If it does not, you need to select the corresponding antenna type of the receiver.

The 'Modify Station' dialog box contains the following fields and values:

- Base: A31C02015 *
- ID: 1
- Net: ☒ *
- Mark:
- Coordinate: BLH(DD.MMSS) ▾
- X: -2689334.6501 m
- Y: 4773466.3791 m
- Z: 3254552.0222 m
- B: 30.524855773
- L: 119.234768667
- H: 106.9023 m
- Protocol: NTRIP ▾ *
- Format: RTCM32 ▾ *
- IP: rtk.sinognss.com *
- Port: 8888 *
- MountPoint: A31C02015 *
- UserName: A31C02015HW1 *
- Password: BASE_A31C02015a *
- Antenna: ▾
- Ant height: 0.000 m
- L1/mm:
- L2/mm:
- N: 0
- E: 0
- U: 0
- RecID:
- RecType: SINOGNSS ▾

Buttons: Modify, Cancel

2) Click **Station** in navigation area to check the status of stations.

Blue-color station icon means that CDC.NET is receiving corrections from the reference station and the station is in net, grey-color station icon means that the station is offline, green-color means that the CDC.NET is receiving corrections from the reference station and the station is out of net.

Right click the All icon, you can add the station, and arrange the added base stations in ascending or descending order

In station interface, you can view the station name, IP, format, network status, GPS week, GPS second, delay, epoch, B, L, H, precision(N), precision(E), precision(U), Antenna Match status, real antenna, current antenna.

If your server is be able to connect to the external network port or open the corresponding rules in the firewall, when CDC.NET receives the 24h base station data, CDC.NET will perform PPP calculation on the collected data based on the latest epoch, and display the difference between the coordinates of the base station input by the customer and the PPP calculation result, that are precision(N), precision(E), precision(U). Through these differences, we can intuitively see whether the base station coordinates are based on the same coordinate system frame. If the coordinate system frame is inconsistent, that is, the difference between the networked base stations and PPP is inconsistent, then the cell composed of these base stations will float.

Station	ID	Name	IP	Format	Status	Week	Second	Delay	Epoch	B	L	H	Precision(N)	Precision(E)	Pre
All	4	A31C02252 rtk.sinogn...		RTCM32	In net	2295	207868	0.138	1353	31°14.6684"	119°43'46.5864"	170.4445	-0.17	3.19	
A31C02015	5	A31C02266 rtk.sinogn...		RTCM32	In net	2295	207868	0.057	1353	30°47'42.6424"	119°46'2.7661"	25.9384	-1.13	4.70	
A31C02216	6	A31C02205 rtk.sinogn...		RTCM32	In net	2295	207868	0.021	1353	31°20'26.0185"	119°47'59.6134"	33.4581	-1.12	4.11	
A31C02014	7	A31C02039 rtk.sinogn...		RTCM32	In net	2295	207868	0.138	1353	31°49'53.2779"	119°54'55.8644"	70.8960	-1.36	3.76	
A31C02252	8	A31C02024 rtk.sinogn...		RTCM32	In net	2295	207868	0.008	1353	30°33'10.2060"	119°57'34.5979"	52.9241	-1.33	4.91	
A31C02266	9	A31C02238 rtk.sinogn...		RTCM32	In net	2295	207868	0.197	1353	30°42'43.6648"	120°22'21.8200"	35.8705	-0.50	3.70	
A31C02205	10	A31C02093 rtk.sinogn...		RTCM32	In net	2295	207868	0.002	1353	30°54'1.2148"	120°5'56.4152"	51.9317	-1.07	4.69	
A31C02039	12	A31C02029 rtk.sinogn...		RTCM32	In net	2295	207868	0.129	1353	30°45'22.6709"	120°19'56.3812"	23.2997	-1.09	4.87	
A31C02238	13	A31C02027 rtk.sinogn...		RTCM32	In net	2295	207868	0.002	1353	30°51'52.8448"	120°25'19.1780"	29.0290	-1.19	4.61	
A31C02093	14	A31C02018 rtk.sinogn...		RTCM32	In net	2295	207868	0.087	1353	31°19'32.7248"	120°25'42.5134"	42.4272	-0.81	4.48	
A31C02029	15	A31C02196 rtk.sinogn...		RTCM32	Offline					30°37'29.4899"	120°45'52.1376"	30.2459			
A31C02027	16	A31C02182 rtk.sinogn...		RTCM32	In net	2295	207868	0.123	1353	30°57'52.4936"	120°48'24.8245"	28.2776	-1.09	4.86	
A31C02018	17	A31C02035 rtk.sinogn...		RTCM32	Offline					31°27'46.8847"	120°53'22.8260"	25.4676			
A31C02196															
A31C02182															
A31C02035															
A31C02036															
A31C02261															
A31C02021															
A31C02117															

InNet/TotalCount: 23/27

Station Line Cell

In Line interface, you can view the baseline details, including each baseline length, solution status, STD_2D, STD_H, tracked satellites and fixed satellites.

Station	ID	Baseline	Distance	Status	STD_2D	STD_H	GPS	BDS	GLO	GAL	FixedSat(GPS)	FixedSat(BDS)
All	17	A31C02014-A31C02039	61.22km	float	0.000	0.000	1/5, Ref.2	1/17, Ref.9	1/3, Ref.22	1/4, Ref.33		
A31C02015	9	A31C02014-A31C02205	21.98km	float	0.000	0.000	1/6, Ref.2	1/17, Ref.9	1/3, Ref.22	1/4, Ref.33		
A31C02216	3	A31C02014-A31C02252	41.35km	float	0.117	0.154	1/6, Ref.2	1/16, Ref.9	1/3, Ref.22	2/4, Ref.33		
A31C02014	4	A31C02015-A31C02014	56.25km	fixed	0.000	0.000	4/6, Ref.2	10/17, Ref.9	1/3, Ref.22	1/4, Ref.33	G7G8G21	C1C3C4C6C9C10C24C
A31C02252	7	A31C02015-A31C02216	36.39km	fixed	0.030	0.039	7/7, Ref.2	20/20, Ref.9	5/5, Ref.22	5/5, Ref.33	G7G8G14G17G21G30	C1C2C3C4C5C6C9C10C
A31C02266	0	A31C02015-A31C02252	35.30km	fixed	0.022	0.029	5/5, Ref.2	17/18, Ref.9	5/5, Ref.22	4/4, Ref.33	G7G14G21G30	C1C2C3C4C6C9C10C16C
A31C02039	2	A31C02015-A31C02266	36.71km	fixed	0.033	0.043	7/7, Ref.2	20/20, Ref.9	5/5, Ref.22	5/5, Ref.33	G7G8G14G17G21G30	C1C2C3C4C5C6C9C10C
A31C02024	31	A31C02018-A31C02117	79.47km	fixed	0.027	0.035	8/8, Ref.2	20/20, Ref.9	5/5, Ref.22	4/4, Ref.33	G7G8G14G16G17G21G30	C1C2C3C4C5C6C9C10C
A31C02093	30	A31C02018-A31C02182	53.90km	fixed	0.033	0.044	8/8, Ref.2	19/20, Ref.9	5/5, Ref.22	4/4, Ref.33	G7G8G14G16G17G21G30	C1C2C3C4C5C6C9C10C
A31C02029	33	A31C02018-A31C02261	62.51km	fixed	0.016	0.022	8/8, Ref.2	20/20, Ref.9	5/5, Ref.22	4/4, Ref.33	G7G8G14G16G17G21G30	C1C2C3C4C5C6C9C10C
A31C02027	46	A31C02021-A31C02067	26.74km	fixed	0.009	0.012	6/6, Ref.2	18/19, Ref.9	5/5, Ref.22	4/4, Ref.26	G7G8G14G21G30	C1C2C3C4C6C9C10C16C
A31C02018	39	A31C02021-A31C02284	29.45km	fixed	0.022	0.029	8/8, Ref.2	20/20, Ref.9	5/5, Ref.22	4/4, Ref.33	G7G8G14G16G17G21G30	C1C2C3C4C5C6C9C10C
A31C02196	24	A31C02024-A31C02029	42.25km	fixed	0.017	0.023	8/8, Ref.2	20/20, Ref.9	5/5, Ref.22	5/5, Ref.33	G7G8G14G16G17G21G30	C1C2C3C4C5C6C9C10C
A31C02182												
A31C02035												
A31C02036												
A31C02261												
A31C02021												
A31C02117												

LineCount: 52/55

Station Line Cell

In Cell interface, you can view the details of cells, including solution status, commonly tracked satellites and fixed satellites. The number in the first column of Satellites and FixedSat indicates the total number of satellites, followed by the number of satellites in each satellite system.

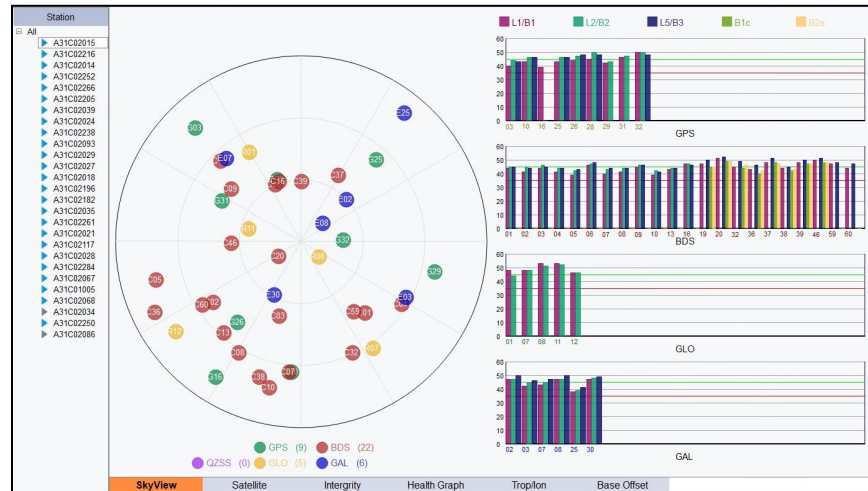
Station	ID	Cell	Status	Satellites	FixedSat
All	8	A31C02014-A31C02205-A31C...	float	1, GPS0, BDS1, GLO0, GAL0	1, GPS0, BDS1, GLO0, GAL0
A31C02015	4	A31C02014-A31C02252-A31C...	float	1, GPS0, BDS1, GLO0, GAL0	1, GPS0, BDS1, GLO0, GAL0
A31C02216	1	A31C02015-A31C02014-A31C...	float	2, GPS0, BDS2, GLO0, GAL0	2, GPS0, BDS2, GLO0, GAL0
A31C02014	3	A31C02015-A31C02216-A31C...	fixed	37, GPS7, BDS20, GLO5, GAL5	36, GPS6, BDS20, GLO5, GAL5
A31C02252	0	A31C02015-A31C02252-A31C...	fixed	27, GPS6, BDS13, GLO5, GAL3	27, GPS6, BDS13, GLO5, GAL3
A31C02266	20	A31C02018-A31C02182-A31C...	fixed	37, GPS8, BDS18, GLO5, GAL6	36, GPS8, BDS18, GLO5, GAL5
A31C02039	18	A31C02018-A31C02261-A31C...	fixed	38, GPS8, BDS20, GLO5, GAL5	36, GPS6, BDS20, GLO5, GAL5
A31C02024	26	A31C02021-A31C02284-A31C...	fixed	32, GPS6, BDS17, GLO5, GAL4	31, GPS6, BDS17, GLO4, GAL4
A31C02093	13	A31C02024-A31C02238-A31C...	fixed	35, GPS7, BDS19, GLO4, GAL5	34, GPS7, BDS19, GLO4, GAL4
A31C02029	17	A31C02027-A31C02018-A31C...	fixed	36, GPS8, BDS18, GLO5, GAL5	34, GPS7, BDS18, GLO5, GAL4
A31C02027	28	A31C02028-A31C02067-A31C...	fixed	32, GPS6, BDS17, GLO5, GAL4	31, GPS6, BDS17, GLO4, GAL4
A31C02018	16	A31C02029-A31C02027-A31C...	fixed	38, GPS8, BDS20, GLO5, GAL6	36, GPS7, BDS20, GLO5, GAL4
A31C02196	19	A31C02029-A31C02182-A31C...	fixed	35, GPS8, BDS17, GLO5, GAL5	32, GPS6, BDS17, GLO5, GAL4
A31C02182	30	A31C02067-A31C02068-A31C...	fixed	34, GPS6, BDS18, GLO5, GAL5	34, GPS6, BDS18, GLO5, GAL5
A31C02035					
A31C02036					
A31C02261					
A31C02021					
A31C02117					

CellCount: 30/33

Station Line Cell

Click station name to check the station information, include Sky View, Satellite, Integrity, Health Graph, Trop/Ion and Base Offset.

- Sky View: You can view the satellite sky view of any base station and the satellite numbers and frequency of each system.



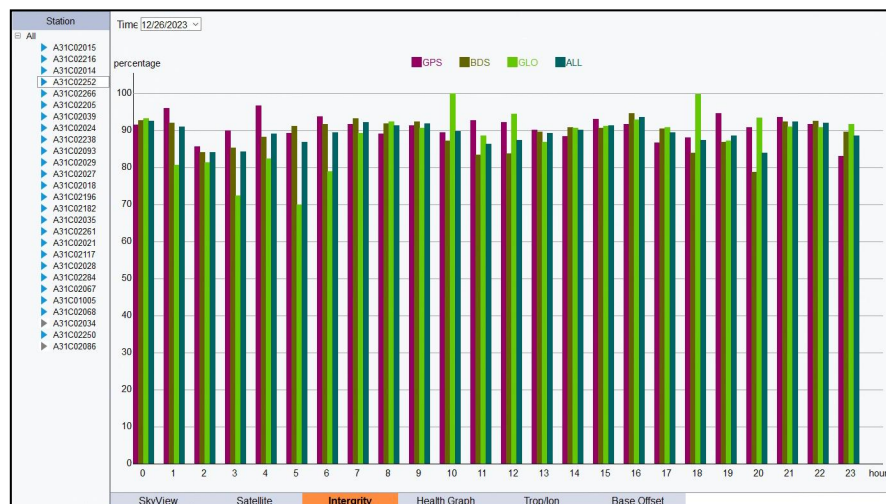
Sky View

- **Satellite:** You can view the satellite details of any base station.

Station	Satellites	Elevation	Azimuth	SNR(L1/B1)	SNR(L2/B2)	SNR(L5/B3)	MP1	MP2	ION(m)	TRO	σ (rms), IonE(n/rms), TropE	Delay	Health
All	G02	73°	60°	47	42	0	0.060	0.223	0.500	2.503	0.000(0.000) 0.000(0.000)	-0.338	healthy
	G03	14°	147°	39	45	44	0.530	0.197	26.875	9.363	0.000(0.000) 0.000(0.000)	14.713	healthy
	G07	55°	230°	46	47	0	0.181	0.084	3.020	2.908	0.589(0.314) 0.762(0.152)	-1.114	healthy
	G08	37°	47°	44	47	48	0.223	0.067	5.236	3.901	1.263(0.195) 0.849(0.278)	-1.579	healthy
	G14	32°	316°	43	46	45	0.195	0.048	2.770	4.508	0.503(0.263) 1.167(0.171)	-2.094	healthy
	G17	24°	268°	42	43	0	0.063	0.048	3.717	5.821	1.371(0.146) 2.349(0.587)	-4.782	healthy
	G21	58°	49°	46	38	0	0.020	0.264	1.465	2.803	0.135(0.163) 0.184(0.130)	-0.001	healthy
	G22	14°	309°	38	21	0	0.377	0.150	3.234	9.318	0.734(0.076) 4.872(0.478)	-7.618	healthy
	G30	47°	283°	45	47	48	0.022	0.167	4.968	3.276	0.731(0.317) 0.767(0.068)	4.527	healthy
	C01	44°	138°	45	45	45	0.012	0.173	2.394	3.409	6.280(0.140) 1.106(0.481)	-7.436	healthy
	C02	35°	233°	41	45	44	0.285	0.141	0.161	4.119	4.455(0.117) 1.697(0.201)	-5.176	healthy
	C03	51°	197°	45	46	46	0.057	0.190	0.322	3.066	3.582(0.092) 0.617(0.394)	-2.458	healthy
	C04	33°	121°	42	44	45	0.193	0.003	0.947	4.299	10.512(0.000) 2.582(0.431)	-7.451	healthy
	C05	15°	252°	37	41	41	0.110	0.202	3.949	9.110	8.835(0.151) 5.915(0.212)	-5.759	healthy
	C06	37°	203°	43	45	45	0.022	0.081	1.948	3.980	8.206(0.308) 1.621(0.523)	-2.647	healthy
	C08	11°	176°	39	42	42	0.813	0.345	24.230	11.711	11.013(0.000) 8.582(0.026)	22.575	healthy
	C09	47°	227°	44	47	45	0.097	0.023	3.145	3.263	2.360(0.148) 0.915(0.447)	-0.717	healthy
	SatCount: 40/41												
	SkyView Satellite Integrity Health Graph Tropion Base Offset												

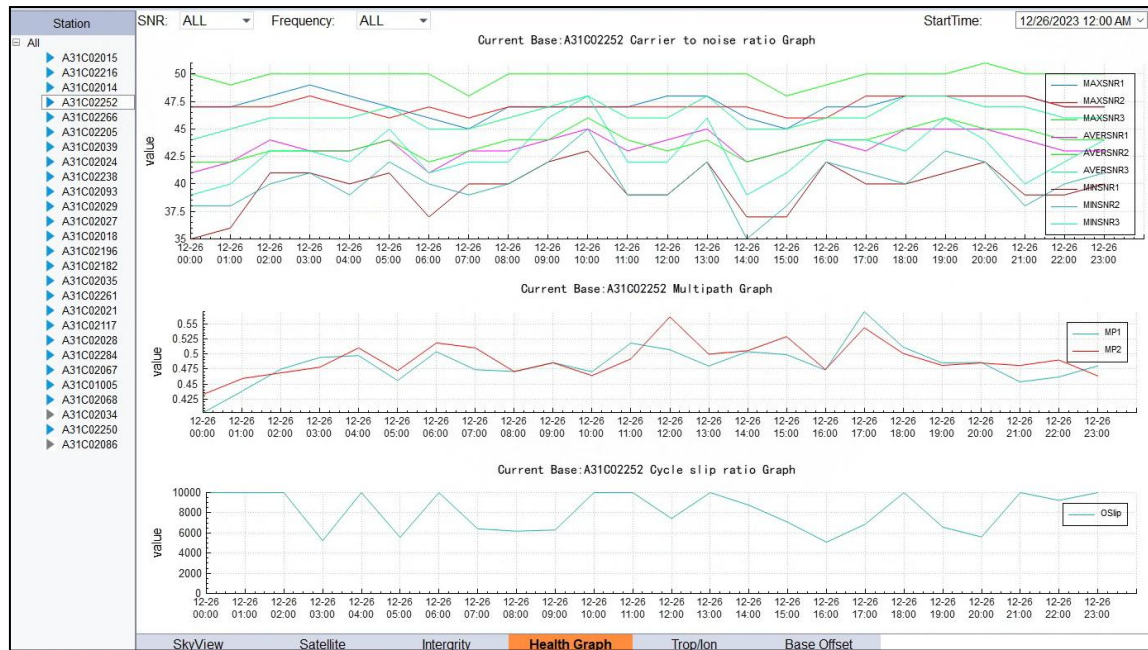
Satellites Info

- **Integrity:** You can view the complete rate data of each system satellite of any base station.



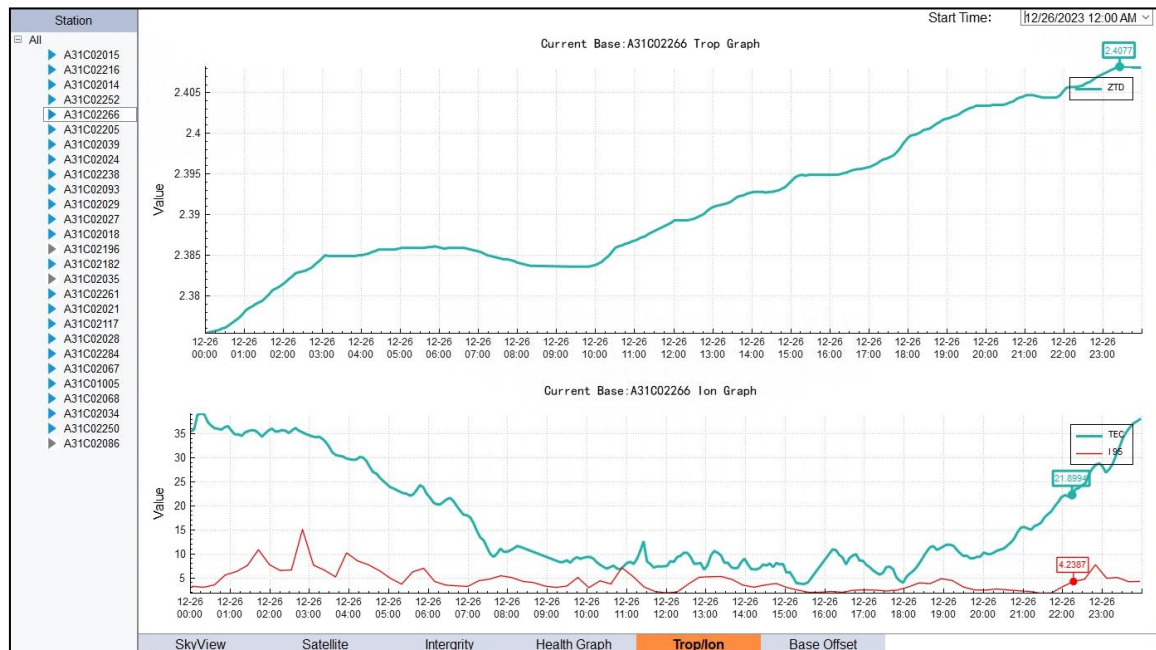
Integrity

- **Health Graph:** Select any base station, click on the Health Graph chart, and select the start time to view the CNR, multipath, and cycle slip ratio information of the base station every hour from the start time as the starting point.

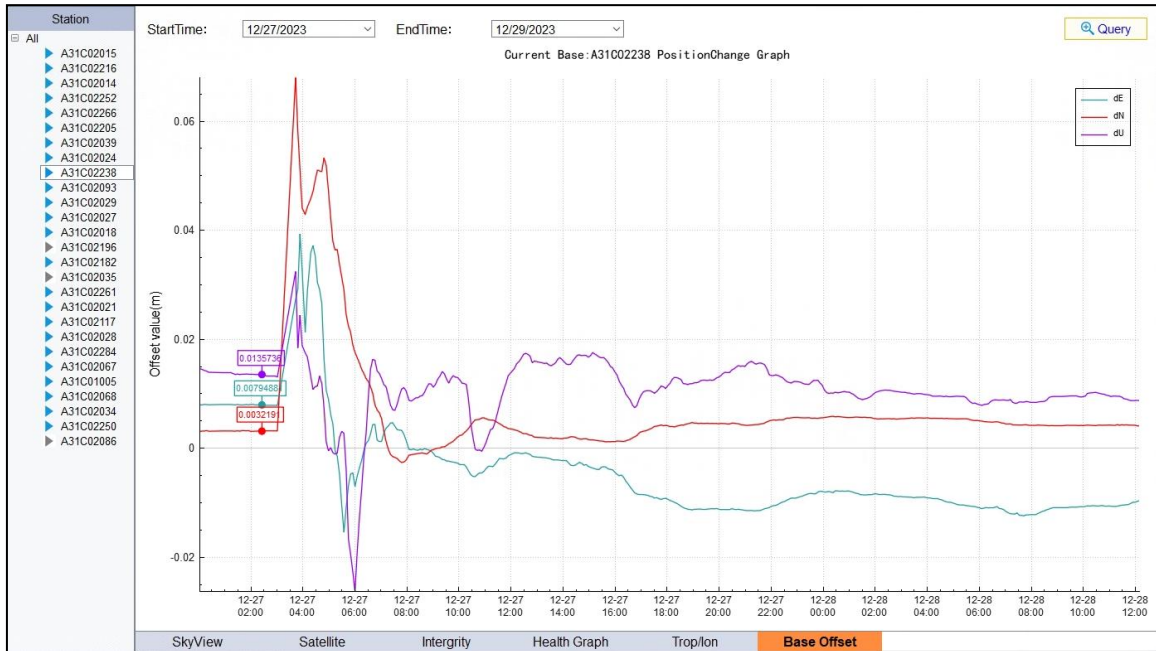


Health Graph

- **Trop/Ion,** you can view the tropospheric curve, ionospheric curve and $i95^4$ curve of each station at a specific time

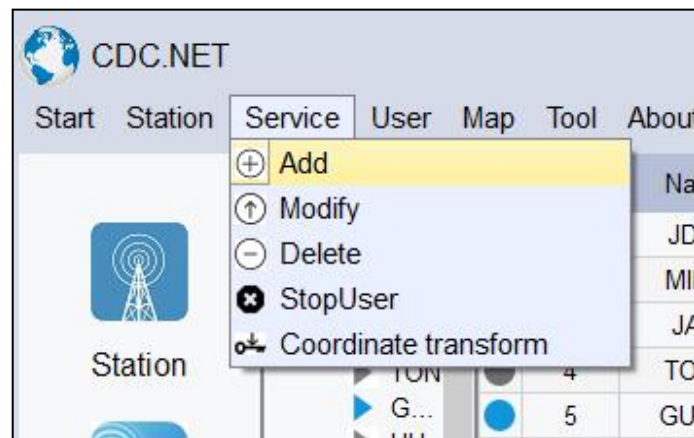


- **Base offset:** You can view the offset of each station at the specific time.



3.4.2 Create service

CDC.NET delivers customized services in a wide range of formats. Click **Service** in menu bar → Click **add** → enter information of the name, protocol and port in general → design the streams in MountPoint → Click **add** → Click **Save**.



The 'Add Service' dialog box, MountPoint tab, contains the following fields and controls:

- Name:** A text input field.
- Type:** A dropdown menu with 'Ntrip' selected.
- Port:** A text input field.
- Server:** A text input field with 'CDC.NET' as the default value.
- State:** A checkbox that is checked.
- Buttons:** 'Save' and 'Cancel' buttons at the bottom.

Name: Enter the name for the current service

Type: Supports Ntrip and TCP protocol

Port: Enter the port for the current service

Server: You can define the service server, the default is CDC.NET

State: The current running status of the service.

The 'Modify Service' dialog box, MountPoint tab, contains the following fields and controls:

- MountPoint:** Text input field with 'M300_pro'.
- Frequency:** Text input field with '1' and unit 's'.
- B:** Text input field with '30.000000000'.
- L:** Text input field with '120.000000000'.
- Country:** Text input field with 'China'.
- Agency:** Text input field with 'Sino'.
- Format:** Dropdown menu with 'RTCM32-MSM4'.
- Message:** Checkboxes for BDS, BDS3, GPS, GLO, GAL, each with a corresponding frequency value.
- QZSS:** Checkboxes for QZSS, each with a corresponding frequency value.
- Residual:** Checkboxes for BDS, GPS, GLO, GAL, each with a corresponding frequency value.
- PosMode:** Dropdown menu with 'VRS'.
- Choose Coord:** Checkboxes for 1021, 1023, 1025, and an 'Edit Coord' button.
- Buttons:** 'Add', 'Modify', 'Delete', 'Clear' buttons above a table, and 'Save', 'Cancel' buttons at the bottom.

ID	MountPoint	Mode	Format	System	Frequency
1	M300_pro	VRS	RTCM32-MSM4	BDS+BDS3+GPS+GLONASS+GAL+QZSS	1
2	M300_pr...nearest	NEAREST	RTCM32-MSM4	BDS+BDS3+GPS+GLONASS+GAL+QZSS	1
3	M300_pro_SRTK	SRTK	RTCM32-MSM4	BDS+BDS3+GPS+GLONASS+GAL+QZSS	1

- When adding a mount point, you can select the corresponding data format. There are currently seven data formats to choose: RTCM32-MSM4, RTCM32-MSM5, RTCM32-

MSM7, RTCM31, RTCM30, RTCM23, RTCM2X, CMR, CMR+. The default data format is RTCM32-MSM4.

- **Residual:** Residual message calculated after CDC.NET generates VRS, RTCM1030⁶ and 1031 are the ionospheric and tropospheric residuals calculated after CDC.NET generates VRS. CDC.NET can output these messages to terminal.
- **PosMode(Positioning Mode)** contains five modes: VRS, NEAREST, RTD, SRTK, GRID and FKP. The default PosMode is VRS.

VRS: Virtual Reference Station. Use a virtual reference station near the mobile station as a base station to transmit differential data;

NEAREST: select the nearest base station to transmit differential data;

RTD: Real Time Differential. pseudo-range differential mode;

SRTK: arbitrarily select a single base station as RTK;

GRID: grid function. Users in a single grid use the same virtual base station to reduce the pressure on the system and meet the demand for high concurrency

FKP: Flchenkorrekturparameter, that is regional correction parameter method. In a large area (or a certain city), establish several (more than three) continuously operating CORS stations; each base station collects the synchronous observation values without differential processing collected at each observation moment in real time. Transmitted to the CDC.NET; processed in real time by the CDC.NET, a PKP error correction number is generated, and then sent to each rover in the area through RTCM; the rover effectively combines its own observation value and FKP error correction number to complete real-time RTK

The screenshot shows the 'Add Service' dialog box with the 'MountPoint' tab selected. The fields are as follows:

- MountPoint:** [Empty field]
- Frequency:** 1 s
- B:** 30.000000000 *
- L:** 120.000000000 *
- Country:** China
- Agency:** Sino
- Format:** RTCM32-MSM4 *
- Message:** BDS ☒ BDS3 ☒ 1124 GPS ☒ 1074 GLO ☒ 1084 GAL ☒ 1094
- QZSS:** ☒ 1114
- Residual:** BDS ☐ 0036 GPS ☐ 1030 GLO ☐ 1031 GAL ☐ 0037
- QZSS:** ☐ 0038
- Base Coord:** 1074,1114,1124,1084,1094,1033,1005,1006,1008
- PosMode:** VRS
- Base Coord:** NEAREST
- Buttons:** Add, Modify, Delete, Clear
- ID:** FKP
- Table Headers:** ID, Mode, Format, System, Frequency
- Buttons:** Save, Cancel

Choose Coordinate transformation system: If you have already created a coordinate transformation system, then when creating a service you can select the coordinate transformation system you want from the drop-down box and check the corresponding 1021, 1023, 1025 options as needed, so that the user receives the differential data as well as 1021, 1023, 1025 coordinate transformation messages.

Edit Coord: Edit coordinate transformation system, click this button, it will jump to the coordinate transformation system interface, and you can edit the coordinate transformation system.

Add: Enter the mountpoint name, select format, PosMode and coordinate transformation, then click Add to add the mountpoint to the list, click Save to save the configuration of the service.

Modify: Select one mountpoint in the list and change the information and click Modify, then click Save to save the configuration of the service.

Delete: Select one mountpoint in the list and click Delete, the selected mountpoint will be deleted from the list, click Save to save the configuration of the service.

Clear: Click Clear, the whole mountpoints in the list will be removed, click Save to save the configuration of the service, click Cancel to cancel current configuration.

Service	Name	MountPoint	B	L	H	MainStation	AuxStation	Baseline	Sat	Speed	PosMode	Status	Used Sat	Delay	Property	Value
Service1	1hour	M300_pro...	31°2'10.0572"	121°17'33.1017"	28.8328	A31C02028		11.31m	G9C18R8...	0.00km/h	nearest	fixed	24	1	ID	
															Name	1hour
															Password	1hour
															Company	
															ChargeType	Time
															RegisterDate	2023-11-27
															ExpireDate	
															DataLimit	
															TimeLimit	0d1hour
															Type	all
															LastOnlineTime	
															LastOfflineTime	
															IP	192.168.1.129
															Port	61390
															Device Type	
															Device ID(SN)	

Click **Service** on the left taskbar to view the details of Service and the current online users.

The blue icon means that the solution status is fixed, yellow icon means that the solution status is float, red icon means that the solution status is single.

Specific information about online users includes: BLH at the current location, main station, auxiliary base station (only used in VRS), baseline length, tracking satellite system and number of satellites, speed, Positioning mode, solution status, number of satellites used, differential Delay, local time, login time, online time, data flow rate, total traffic, customer software information, receiver type, receiver SN

The information bar on the right displays the registration information of the selected online user and the last online and offline time.

Service	ID	MountPoint	PosMode	Format	FormatType	Frequency	B	L	Country	Agency
All Service1	1	M300_pro	VRS	RTCM32-...	1074,1114,1124,1084,1094,1033,1005,1006,1008	1			China	Sino
	2	M300_pro_nearest	NEARSET	RTCM32-...	1074,1114,1124,1084,1094,1033,1005,1006,1008	1			China	Sino
	3	M300_pro_SRTK	SRTK	RTCM32-...	1074,1114,1124,1084,1094,1033,1005,1006,1008	1			China	Sino
Name Service1 Type ntrip Port 8612 Status work OnlineUser Service Stop										

Users can click Service on the right menu bar to view the created services and mount points. Click Start/Stop to start/stop a selected service.

3.4.3 User management

1) After create the service, go to **User** -> click **Register** to add users -> enter User name, password, City and more. The UserName, Password, Num limit, User Type, Usable and Charge Type are required, and the others are optional. After completing the filling, click Register to complete the user registration.

Register User

UserName

Demo

Password

a1234

Num Limit

1

User Type

RTK

Usable

☒

City

Shanghai

Company

ComNav Technology Ltd

Address

Building 2, No.618 Chengliu Middle Road, 201801 Shanghai

Contact

Charge Type

Date

Phone

Expire Date

2024-12-27

Mail

Data Limit

1024

mb

AreaName

1

Time Limit

365

day

0

hour

Register

Cancel

User Type: Types of differentiated services that customers are allowed to use, including RTK, RTD and All (RTK, RTD)

Usable: If you check this option, this user can use the services advertised by CDC.NET. If you uncheck this option, this user will not be able to use the services advertised by CDC.NET.

Num limit: The number of users allowed to connect to one user account.

Charge Type: Supports Date, Data, Time. Users can only choose one of the methods to register a user account.

Renewal function: After users registered by duration expire, they can set the duration they want to extend after renewal. (This feature is only available for users who register by duration)

After registering the user, you can choose one user account to modify the details, and you will find Enable item above Num Limit, this means that the current account is the Nth rover account you registered.

AreaName: When registering a user, you can select an Area (Area added in Map->Area Settings). If the user is not in the fenced area, the system will not broadcast differential data to him. If he is in the area, there will be no impact.

If the client fills in the city option when registering, CDC.NET will manage the user information with the name of the city and company name, other users without city information will be classified as a category.

Service		Condition	Name	Key	Query		Refresh										
All																	
Shanghai		3	Demo	Date	2023-12-27	2024-12-27	00s		0.00kb	1	rtk	Shanghai	ComNav T...	Building 2...			
ComNav...		5	Demo2	Date	2023-12-27	2024-12-27	00s		0.00kb	1	all	Shanghai	ComNav T...	Building 2...			
SinoGNSS		7	Demo4	Date	2023-12-27	2024-12-27	00s		0.00kb	1	all	Shanghai	SinoGNSS				
Beijing																	

2) Click **User** in navigation area to check the users information, eg. Charge type, expire date, total data and more. Right click on the user to modify the user and check the trail and log.

User	Condition	Name	Key	Query							
All	ID	Name	ChargeType	RegisterDate	ExpireDate	TimeLimit	TotalTime	DataLimit	TotalData	NumLimit	UserType
122	511	Sino_001	Date	2009-12-31	2009-12-31	45d09h59...	10234486...	10	all		
sh	512	Sino_002	Date	2009-12-31	2009-12-31	45d16h32...	10254879...	10	all		
ks	513	Sino_003	Date	2010-12-31	2010-12-31	44d19h33...	10232932...	10	all		
lk	514	Sino_004	Date	2009-12-31	2009-12-31	46d01h29...	10244270...	10	all		
gpk	515	Sino_005	Date	2009-12-31	2009-12-31	44d17h36...	10210072...	10	all		
GH	516	Sino_006	Date	2009-12-31	2009-12-31	44d19h52...	10257375...	10	all		
LI	517	Sino_007	Date	2009-12-31	2009-12-31	44d17h58...	10222894...	10	all		
SH	518	Sino_008	Date	2009-12-31	2009-12-31	44d17h31...	10208512...	10	all		
32	519	Sino_009	Date	2009-12-31	2009-12-31	44d17h55...	10220447...	10	all		
rew	520	Sino_010	Date	2009-12-31	2009-12-31	44d18h03...	10220492...	10	all		
bj	521	Sino_011	Date	2009-12-31	2009-12-31	44d18h09...	10225476...	10	all		
er	522	Sino_012	Date	2009-12-31	2009-12-31	44d18h57...	10235496...	10	all		
SJ	523	Sino_013	Date	2009-12-31	2009-12-31	44d20h20...	10216985...	10	all		
Sha...	524	Sino_014	Date	2009-12-31	2009-12-31	44d17h38...	10212371...	10	all		
	525	Sino_015	Date	2009-12-31	2009-12-31	44d19h05...	10218448...	10	all		
	526	Sino_016	Date	2009-12-31	2009-12-31	44d18h16...	10223734...	10	all		
	527	Sino_017	Date	2009-12-31	2009-12-31	44d18h55...	10225813...	10	all		

Users: 346

UserLog

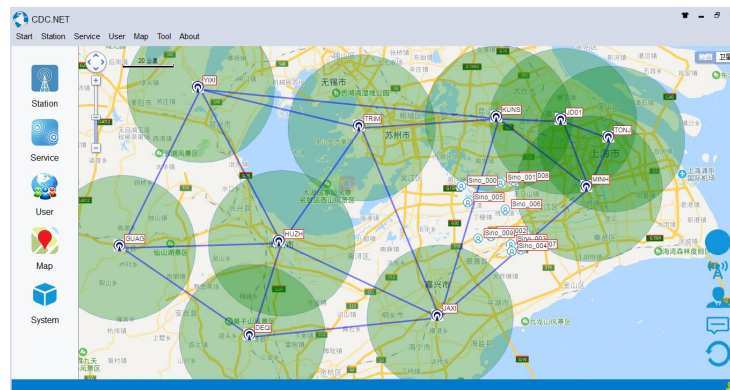
3) User query: In the user interface, enter the keyword of the user name or the user company to be queried, then click Query to query the user, and click Refresh to cancel the query.

Condition		Name	Key D			Query	Refresh								
ID	Name	ChargeType	RegisterDate	ExpireDate	TimeLimit	TotalTime	DataLimit	TotalData	NumLimit	UserType	City	Company	Address	Contact	Telep
3	Demo	Date	2023-12-27	2024-12-27		00s		0.00kb	1	rtk	Shanghai	ComNav T...	Building 2...		
4	Demo1	Date	2023-12-27	2024-12-27		00s		0.00kb	2	all					
5	Demo2	Date	2023-12-27	2024-12-27		00s		0.00kb	1	all	Shanghai	ComNav T...	Building 2...		
6	Demo3	Date	2023-12-27	2024-12-27		00s		0.00kb	1	all	Beijing	ComNav T...			
7	Demo4	Time	2023-12-27		0d1hour	00s		0.00kb	1	all	Shanghai	SinoGNSS			
8	Demo5	Date	2023-12-27	2024-12-27		00s		0.00kb	0	all					

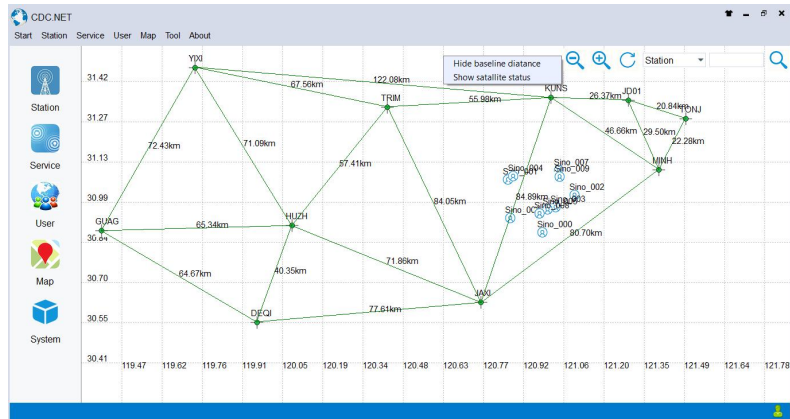
4. CDC.NET functionality

4.1 Map display

CDC.NET supports google map, Baidu map, TianDi Map and station map. All the stations and users can be shown in map.



Google map



Station map

In station map, CDC.NET support fuzzy query, you can type in the key words and click search icon to query the station or user on the map, the searched results will be marked as red name.

4.1.1 Map settings

You can set the transparency and radius of the base stations of Baidu Maps, Google Maps and Station Maps to beautify the map. In addition, you can set the latitude and longitude of the center position of the map display and the size of the zoom level.

Map setting

4.1.2 Area settings

The area setting function can be set to add any number of fences. At least three or more position points of any longitude and latitude can be set in the fence. The area enclosed by these position points is the scope of the fence. After enter the values, click Modify to save.

Tip: The input longitude and latitude points must be in a certain order, such as clockwise order, Otherwise, the generated Area will appear in the shape of "X"

NO	Area Name
4	1
5	12
6	Test
3	TEST02.09

Area Name: Test

Add Modify Delete

Area Name: Input the area name, then click Add, the area will be added to the list above the interface.

Modify: Select one area in the list, change the area name in the list and click the Modify, the name of this area will be changed.

Delete: Select one area in the list, click Delete, the area will be deleted in the list.

NO	Area Name	Longitude	Latitude
26	Test	119	32
27	Test	122	32
28	Test	122	30
29	Test	119	30

Lon: 119.00 Lat: 30.00

Add Modify Delete

Area Name: You can't change the name then click Modify to change name.

Add: You can enter the Longitude and Latitude then click Add, the point will be added in the graph above.

Modify: Change the longitude and latitude values in the graph then click Modify, the value will be changed.

Delete: Select one row in the graph, then click Delete, you are allowed to delete the selected row.

You can add a fence to any online user. Click User to find the user you want to add a fence. Right-click to modify, select the corresponding fence in the fence name drop-down box, click Update. If the user is not in the fenced area, the system will not broadcast differential data to him. If he is in the area, there will be no impact.

Modify User

UserName: Demo1 Enable: 4

Password: 12345 Num Limit: 2

User Type: ALL Usable: ☒

City: Beijing

Company: ComNav Technology Ltd

Address:

Contact: Charge Type: Date

Phone: Expire Date: 2024-12-27

Mail: Data Limit: mb

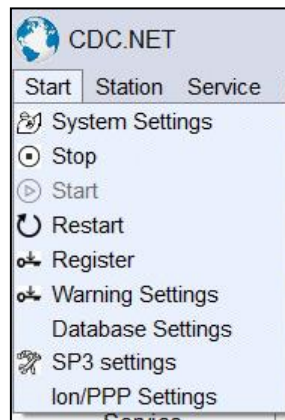
AreaName: Test2 Time Limit: day hour

Renewal + day hour

Modify Cancel

4.2 Start menu bar

There are various settings you can configure based on your requirements: System settings, SP3 settings, Warning Settings, Database Settings and Ion/PPP Settings.



4.2.1 System settings

You can change settings for system calculation and database. You need to stop service first then can change the save path. Related functions are set as follows:

- **Parameter Settings:**

- 1) The software defaults to check the four systems to participate in the calculation, and the user can remove any system and any satellite by himself.

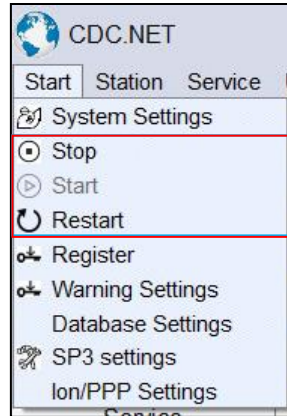
- 2) **Rebuild net when station disconnect:** If one or several base stations stop transmitting data to CDC.NET, checking this option will remove the offline base stations and re-establish the network.
- 3) **Correct receiver CPB⁵:** This is intended to compensate for the first-order inter-frequency PhaseRange biases introduced by the reference receiver CPB of other brand to achieve better solution result.
- 4) Keep the default settings such as Leap Seconds and other related settings;
- 5) **Max Baseline:** After setting the maximum distance of baseline, the system does not generate more than the length of the base;
- 6) **Log Path:** Under the Log Path, you can view software related logs about base stations, user online and offline, and data transmitting; Enter the email account to receive related notification and alarm emails.

● Calculating Settings:

4.2.2 Software Service

- **Stop:** When the software is running, click *Stop* to stop the software running
- **Start:** After stopping the service, click *Start* to resume software operation

- **Restart:** During the running of the software, you can directly click **Restart** to restart the software. After adding a new base station or making other settings you may need to restart the service to make it take effect.



4.2.3 Register

If it is the first installation that requires registration, registration code is required to activate the software.

After the registration is completed, you need to restart the service.

4.2.4 Warning Settings

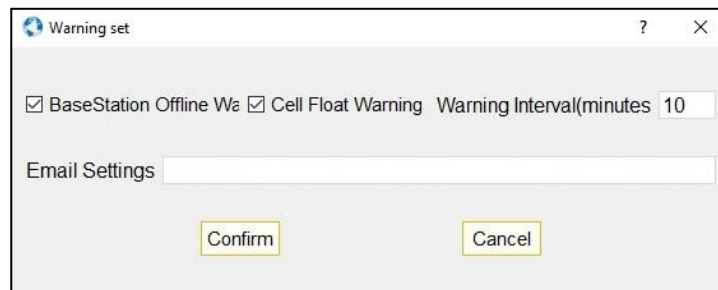
Warning setting function: Supports base station offline warning and Cell float warning functions.

Base station offline warning: Send an alarm email when the base station goes offline;

Cell status warning: When the status of a specific cell becomes floating, an alarm email is sent;

Warning interval: You can set the minimum interval for sending alarm emails to avoid sending emails frequently;

Warning mail settings: You can enter one or more mailboxes. When entering multiple mailboxes, use commas to separate them;



4.2.5 Database Settings

Database: Shows the parameters: IP, Port, DataBase, Username, Password that set during mysql installation.

Backup: Click **Browse** to select the file path, and then click **Backup** to back up the current database to an sql file. It is recommended to develop the habit of backing up the database at intervals to prevent unexpected situations of database loss later.

Restore: Click **Browse** to select the previously backed up sql file, click **Restore** to restore the previous database.

Select Table: Includes Base Station, User info, mount point.

Import Excel file/Export Excel file: You can import or export the base station table, user table and mount point table in the database. The format is defined according to the table format in the database. After importing, you need to restart the service.

Clear: You can clear the base station table, user table or mount point table in the database , the service needs to be restarted after clearing.

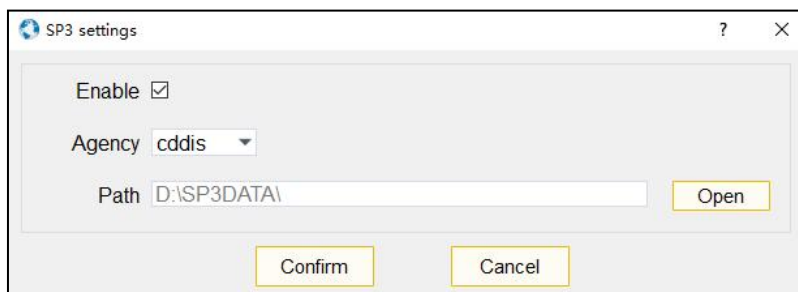
Save: After operating on the database content, click Save to save the configuration.

The screenshot shows a 'Database Settings' window. It contains the following fields and controls:

- IP:** 127.0.0.1
- Port:** 3306
- DataBase:** vrs
- Password:** 1234
- User Name:** root
- Backup:** (empty text field) with a **Browse** button and a **Backup** button.
- Restore:** (empty text field) with a **Browse** button and a **Restore** button.
- Select Table:** A dropdown menu currently showing 'Base station', with a **Clear** button next to it.
- Import Excel file** button
- Export Excel file** button
- Save** button
- Cancel** button

4.2.6 SP3 settings

First, check Enable, select the publishing agency (cdis, opac, whu), set the save path of the precise ephemeris file, and click **Confirm**.



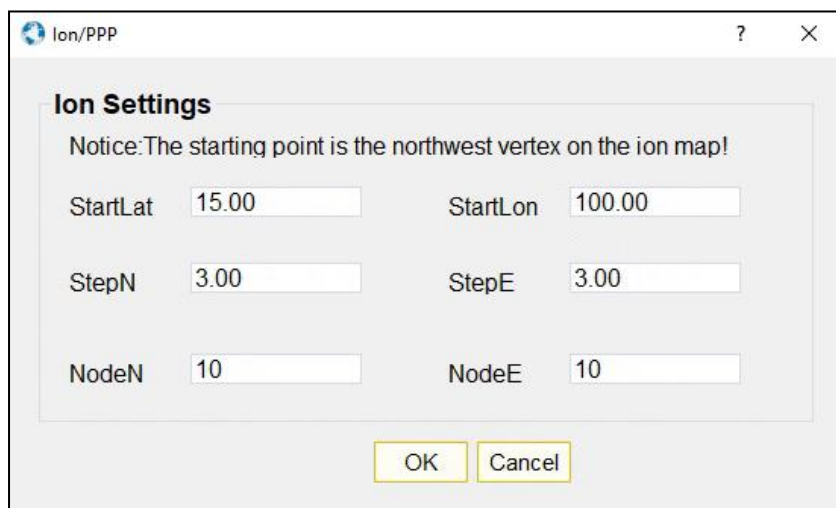
4.2.7 Ion/PPP Settings

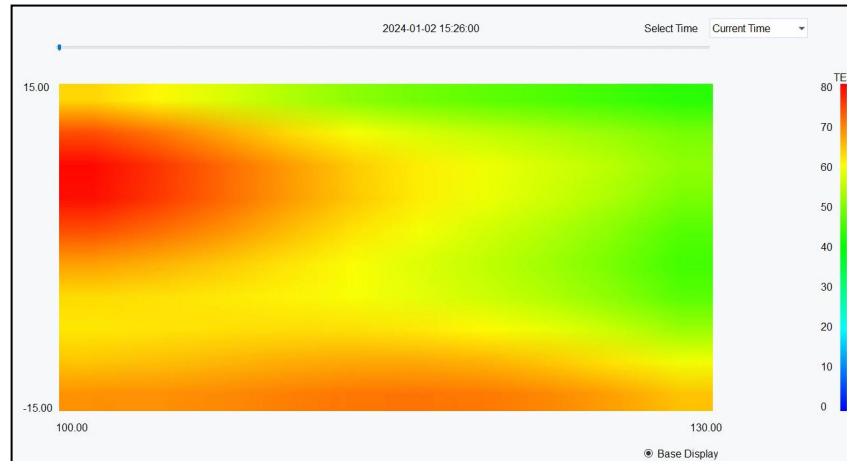
Ionosphere settings: Set the latitude and longitude of the starting point of the ionosphere map and the step size and number of nodes of latitude and longitude. The starting point is the northwest vertex on the ion map.

You can check the ionosphere map in the System->Ion. After you setup the Ion configuration parameters, it will take about 10 minutes to generate the ionosphere data to show the current ionosphere status.

CDC.NET supports to check the ionosphere map of current time, last one hour, last 2 hours, last 6 hours, last 12 hours, last day, last 2 days, last 3 days, last 5 days, last 7 days. In addition to the current time option, you can drag the progress bar to view the ionospheric map of the past time if you choose other options.

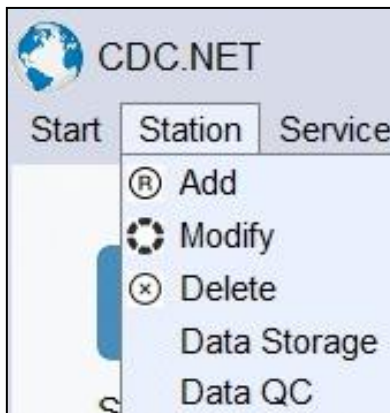
Base Display: Check this option to display the current base station location on CDC.NET on the ionospheric map





4.3 Station menu bar

Under this menu, users can manage base stations, such as adding base stations, editing base stations, deleting base stations, storing base station data, and viewing base station QC.



4.3.1 Data Storage

1) When the service in CDC.NET is started, the data storage path cannot be changed. If you want to change the storage path, you need to stop the service first. Click Start->Stop in the menu bar to stop the service.

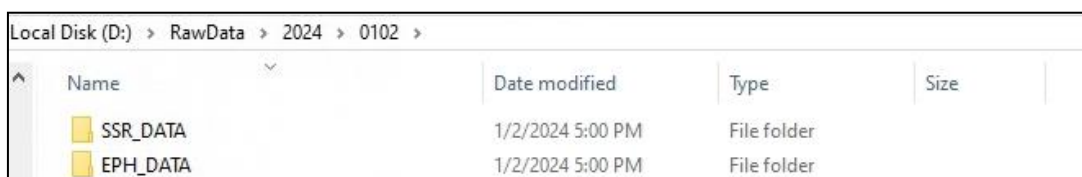
2) **Save Mode:** supports Day of Year and YYYYMMDD (Year or year, month and day) methods.

3) **RINEX Header:** The server in the observation file header file of the Rinex file stored by CDC.NET defaults to CDC.NET, and the company defaults to SINOGNSS. By checking the check box in front of RINEX, customers can customize the content and click Save to save it.



4) **Batch:** Check the checkbox behind Batch to choose to store RINEX files or Raw data (RTCM files) of all base stations, and define the sampling interval, file split and version of rinex file stored by all base stations.

Tip: You can find the precise ephemeris stored under the path of Raw data.



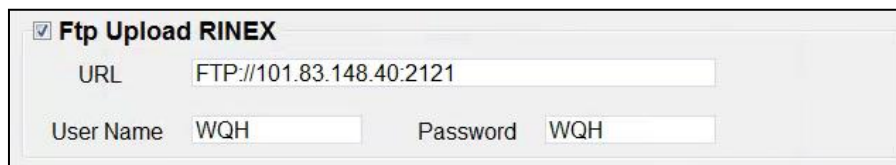
5) CDC.NET also allows customers to check the check box behind the base station to select the specified base station to store RINEX or Raw data. Customers can also define different sampling intervals, file splits and rinex versions for each base station.

6) Rinex sampling interval supports 1s, 5s, 10s, 15s, 30s, 60s, Rinex file and Raw Data split supports 1h, 2h, 4h, 6h, 12h, 24h, and rinex version supports 2.10, 3.02 and 3.04.

7) When the customer stores the Rinex file, click Save button to save the configuration, and then start the service. A Rinex folder will be generated under the path selected by the customer to save the Rinex file of the base station. When the customer stores Raw data, click Save button to save the configuration, and then start the service. The RawData folder will be generated under the path selected by the customer to save the Raw data of the base station.

Batch	☒	Rinex Save	1	24	3.04	☒	RawData Save
Name	☒	Rinex Save	sample interval	single file duration	Rinex Version	☒	RawData Save
JAXI	☒		1	24	3.04	☒	
GUAG	☒		1	24	3.04	☒	
DEQI	☒		1	24	3.04	☒	
YIX2	☒		1	24	3.04	☒	
MLHU	☒		1	24	3.04	☒	
TZCO	☒		1	24	3.04	☒	
YCDF	☒		1	24	3.04	☒	
CZHL	☒		1	24	3.04	☒	

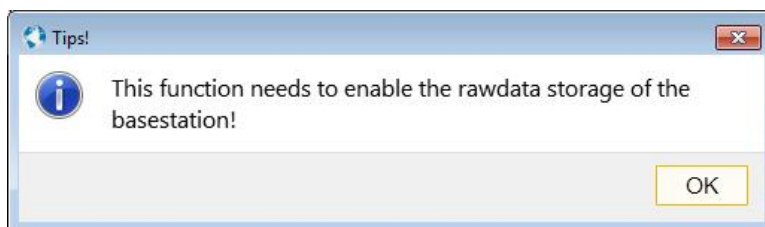
8) **FTP Upload RINEX:** Check the checkbox in front of FTP Upload RINEX, customers can enter the FTP address, username and password, and click the Save button to push the Rinex file of the base station to the designated FTP server.



The screenshot shows a configuration window titled "Ftp Upload RINEX" with a checked checkbox. It contains three input fields: "URL" with the value "FTP://101.83.148.40:2121", "User Name" with the value "WQH", and "Password" with the value "WQH".

4.3.2 Data QC

To use the data quality inspection function, you need to store the Rawdata first and store the Rawdata data of the target base station for one day. Data quality inspection of the previous day's data can only be carried out on the next day. If the customer has stored the raw data of the base station, when the prompt shown below appears, click OK to enter the data QC interface.



Select date: Select the date for data quality inspection. The target base station data must have been stored on this date. Place the cursor at the year/month/day respectively and click the up and down arrows to modify the year/month/day accordingly.

Query: Confirm to query the data quality inspection report for this date.



The screenshot shows a date selection interface. It includes a label "Select Date", a date input field showing "2023/12/28" with up and down arrows, and a "Query" button.

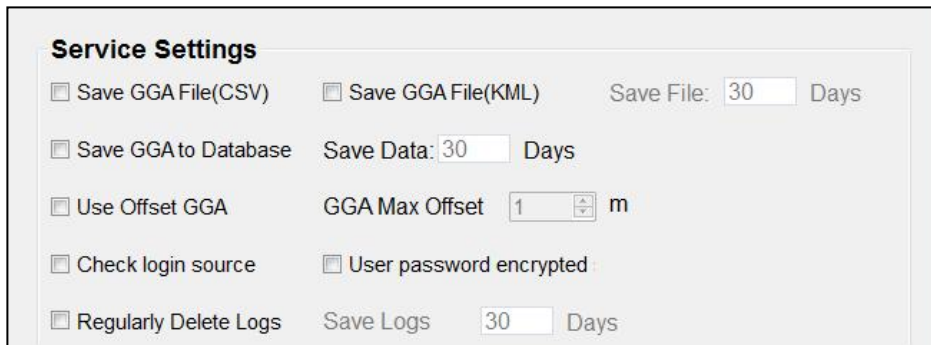
Save Data: After checking the Save GGA to Database option, users can set the number of days for real-time saving of GGA in the database to avoid redundant storage. For example, if the retention period is set to 30 days, CDC.NET database will only retain the user's GGA data for the last 30 days.

Use Offset GGA: After checking and setting GGA maximum offset value, GGA value in the usergga table of the database will be biased.

Check login source: After checking, the software will check the login source of the rover station, and only the rover station of ComNav can log in and use the software service normally;

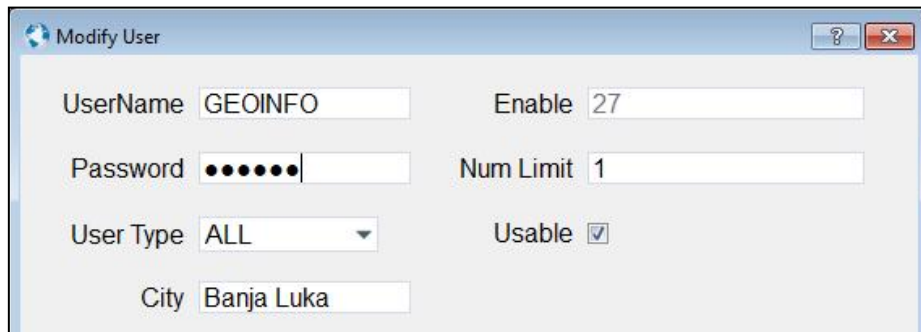
User password encrypted storage: After checking, the user password will be encrypted, and the user password cannot be viewed from the interface and database.

Regularly Delete Logs: Set the number of days to retain software logs to avoid redundant storage; For example, if the retention period is set to 30 days, CDC.NET will only retain the software logs for the last 30 days.



The screenshot shows the 'Service Settings' dialog box. It contains several options with checkboxes and input fields:

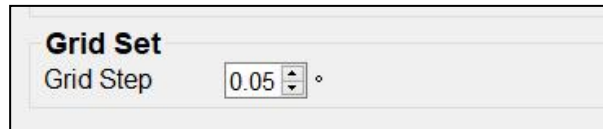
- ☐ Save GGA File(CSV) ☐ Save GGA File(KML) Save File: 30 Days
- ☐ Save GGA to Database Save Data: 30 Days
- ☐ Use Offset GGA GGA Max Offset: 1 m
- ☐ Check login source ☐ User password encrypted
- ☐ Regularly Delete Logs Save Logs: 30 Days



The screenshot shows the 'Modify User' dialog box. It contains the following fields and options:

- UserName: GEOINFO Enable: 27
- Password: [masked] Num Limit: 1
- User Type: ALL (dropdown) Usable: ☒
- City: Banja Luka

Grid Set: Set the step of the grid mode in the service. The default setting is 0.05 degrees, which is equivalent to a grid side length of about 5 km.



Grid Set

Grid Step °

4.4.3 Coordinate transformation

Click Coordinate transformation or click Edit Coord when adding a service to jump to the coordinate transformation interface. After entering the parameters of the coordinate system and clicking Save, you can add a coordinate system. When adding a service, You can choose the coordinate transformation system you created before to broadcast the differential data in the specific coordinate system required by the user.

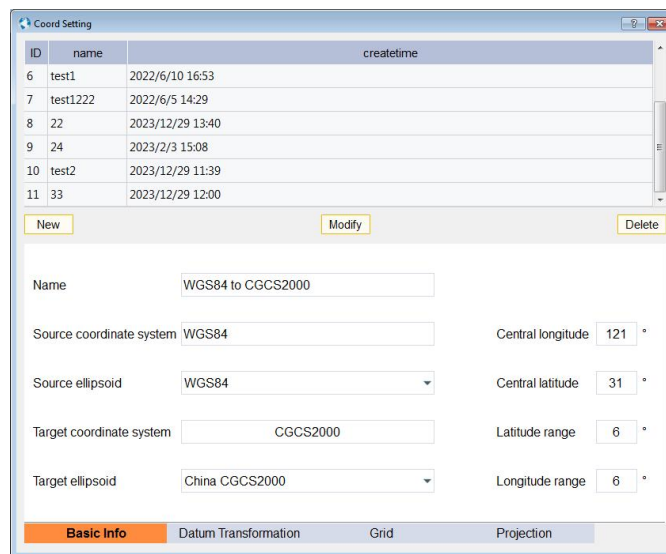
Listed at the top of the page are the coordinate transformation systems created by the user, showing the name and creation time of the coordinate system.

The coordinate transformation system includes Basic Info, Datum transformation, Grid and Projection

New: After entering the above four items, click New to complete a coordinate system conversion system.

Modify: Select one coordinate transformation system in the list, modify the Basic Info, Datum transformation, Grid and Projection, then click Modify, the previous coordinate transformation system will be changed to the current parameters.

Delete: Select one coordinate transformation system in the list, click Delete, the selected coordinate transformation system will be deleted from the list.



ID	name	createtime
6	test1	2022/6/10 16:53
7	test1222	2022/6/5 14:29
8	22	2023/12/29 13:40
9	24	2023/2/3 15:08
10	test2	2023/12/29 11:39
11	33	2023/12/29 12:00

New Modify Delete

Name

Source coordinate system Central longitude °

Source ellipsoid Central latitude °

Target coordinate system Latitude range °

Target ellipsoid Longitude range °

Basic Info Datum Transformation Grid Projection

● Basic Info

Name: You need to name the coordinate transformation system

Source coordinate system: The coordinate system before transformation, that is, the coordinate system of the base station in CDC.NET.

Target coordinate system: The coordinate system after transformation, for example, the local coordinate system.

Source ellipsoid: The ellipsoid before transformation.

Target ellipsoid: The ellipsoid after transformation.

For example, the current base station uses the WGS84 coordinate system and the local coordinate system is CSCS2000. Then the source ellipsoid should be selected as WGS84 and the target ellipsoid should be selected as CGCS2000.

● Datum Transformation

CDC.NET supports Abridged MolodenSki seven-parameter coordinate system transformation method, you can enter seven parameters according to your own needs.

Import coordinate file: This is used to import some pairs of known points and surveyed points to calculate the seven parameters, currently this function is not supported.

● Grid

Fitting model: Geoid model

File Name: Click Select to import the existed geoid file which is stored in the PC, the supported format supports *.XML and *.GGF.

Apply to: The geoid file result will be applied to the geodetic height of source coordinate system.

Elevation direction: Check this option and CDC.NET will use the elevation correction value in the selected file.

Plane direction: Check this option and CDC.NET will use the plane correction value in the selected file.

For example, this is the header file of a 3D Grid correction file, which explains the starting point longitude and latitude, grid step, etc., and includes elevation correction values and plane correction values.

```
<?xml version="1.0" encoding="utf-8"?>
<RESIDUAL xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <Parameters>
    <system_id>3DGrid</system_id>
    <name>NTA - HYBRID GEOID IN VN</name>
    <description>1</description>
    <hres>1</hres>
    <vres>1</vres>
    <type>geodetic</type>
    <unit>d</unit>
    <null_value>999.000</null_value>
    <start_corner>SW</start_corner>
    <Corner_N>31.0</Corner_N>
    <Corner_E>121.0</Corner_E>
    <StepN>0.005</StepN>
    <StepE>0.005</StepE>
    <NODES_N>101</NODES_N>
    <NODES_E>201</NODES_E>
    <Data1>B</Data1>
    <Data2>L</Data2>
    <Data3>H</Data3>
    <horizontal_quality>2</horizontal_quality>
    <vertical_quality>4</vertical_quality>
  </Parameters>
  <Residuals>
    <Res_Data1>
```

● Projection

CDC.NET supports multiple projection conversion methods. You can choose the appropriate projection method according to your own needs.

New
Modify
Delete

Projection type: Transverse Mercator

Central meridian: 120 °

Origin latitude: 0 °

East additive constant: 500000 m

North additive constant: 0.000000 m

Aspect ratio: 1.0000

Basic Info
Datum Transformation
Grid
Projection

After creating a coordinate transformation system, when you create a service, you can select this coordinate transformation system and check on 1021,1023, 1025 options to broadcast your coordinate transformation system to the users according to your own needs.

Modify Service
?
⌵

General
MountPoint

MountPoint: 0209 * Frequency: 1 s

B: 30.0000000000 * L: 120.0000000000 *

Country: China Agency: Sino

Format: RTCM32-MSM4 *

Message: ☒ BDS ☒ BDS3 ☒ 1124 ☒ GPS ☒ 1074 ☒ GLO ☒ 1084 ☒ GAL ☒ 1094

☐ QZSS ☐ 1114

Residual: ☐ BDS ☐ 0036 ☐ GPS ☐ 1030 ☐ GLO ☐ 1031 ☐ GAL ☐ 0037

☐ QZSS ☐ 0038

1074,1124,1084,1094,1033,1005,1006,1008,1021,1023,1025

PosMode: VRS *

Choose Coord: test ☒ 1021 ☒ 1023 ☒ 1025 Edit Coord

Add
Modify
Delete
Clear

ID	MountPoint	Mode	Format	System	Frequency
1	0209	VRS	RTCM32-MSM4	BDS+BDS3+GPS+GLONASS+GAL	1
16	srk	SRTK	RTCM32-MSM4	BDS+BDS3+GPS+GLONASS+GAL	1

Save
Cancel

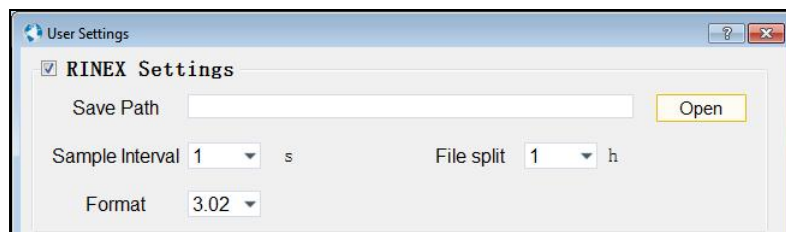
4.5 User menu bar

Under this menu, users can create, edit and delete rover accounts, and store Rinex data of virtual base stations.

4.5.1 Rinex Settings

Check Rinex Settings. Users can select the path for Rinex storage of the virtual base station, set the sampling interval, File Split and file format. After clicking Save, and restart the service, when a rover uses the VRS base station, CDC.NET will automatically store the Rinex file of the virtual base station to the specified under path

- 1) **Sample interval:** supports 1s, 5s, 10s, 15s, 30s, 60s.
- 2) **File Split:** supports 1h, 2h, 6h, 12h, 24h.
- 3) **Format:** supports 3.02 version, 2.10 version.



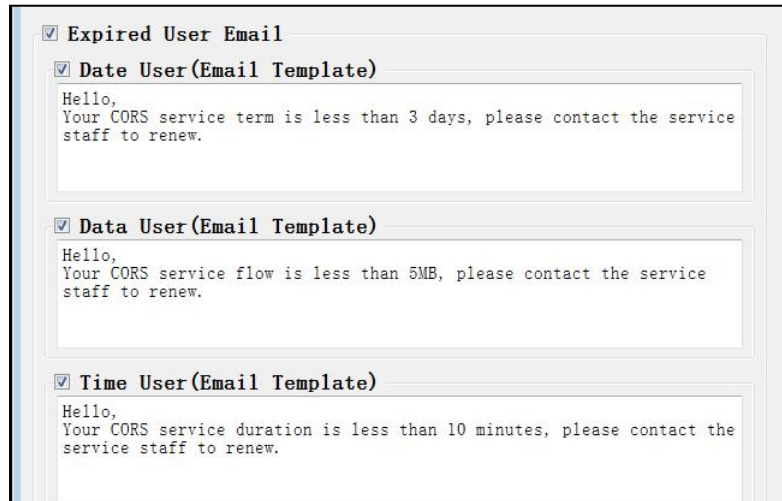
4.5.2 User expired email push

User expired email push: After checking user expired email push, if you have filled in your email address when registering a user, expired emails will be pushed to the user before expiration.

Register users according to the expiration date (the email address information has been filled in when registering the user): an email will be pushed three days before the expiration date. The email template can be edited by yourself or kept as default.

Register users based on traffic (fill in the email address when registering the user): Emails will be pushed when the traffic is less than 5MB. The email template can be edited by yourself or kept as default.

Register users by duration (the email address information was filled in when registering the user): an email will be pushed when the duration is less than 10 minutes. The email template can be edited by yourself or kept as default.



4.6 Tool menu bar

Under this menu, users can change the language displayed by CDC.NET. The currently supported languages are Chinese, English, and Russian.

4.7 About menu bar

Under this menu you can query the current CDC.NET version information.



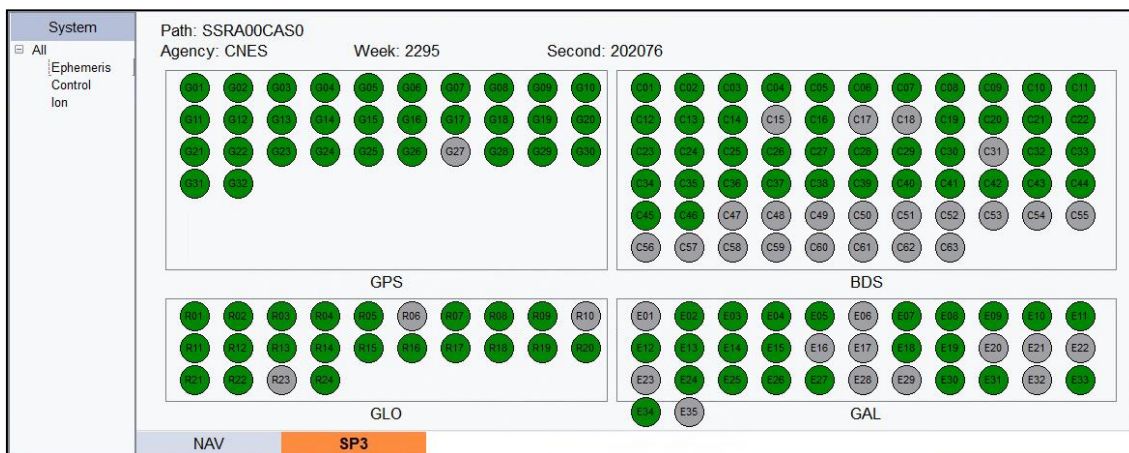
4.8 System menu bar

4.8.1 Ephemeris

Click on the Ephemeris in the system to view the navigation ephemeris used by all base stations.

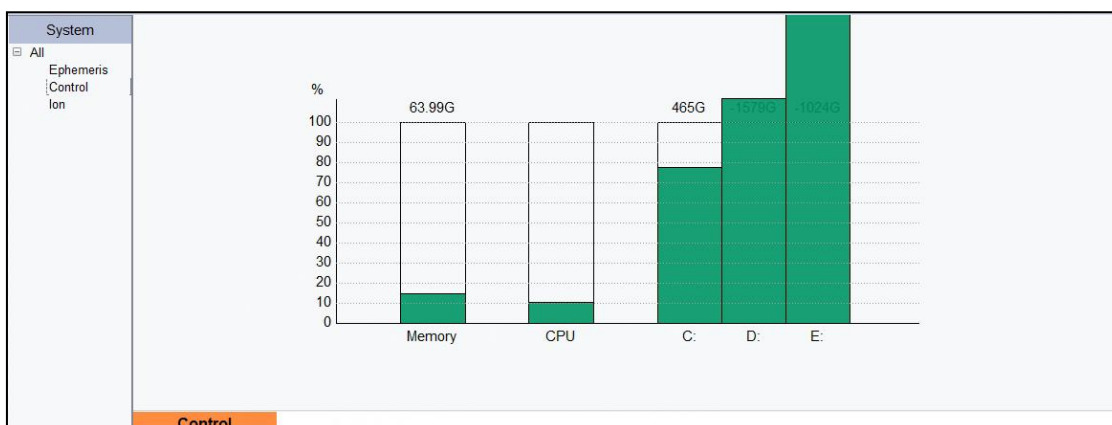
System	Satellite	Status	IOD#	Week	Second
All Ephemeris Control Ion	G01	unhealthy	107	2295	208800
	G02	healthy	23	2295	208784
	G03	healthy	70	2295	208800
	G04	healthy	76	2295	208800
	G05	healthy	15	2295	208784
	G06	healthy	75	2295	208800
	G07	healthy	15	2295	208800
	G08	healthy	66	2295	208800
	G09	healthy	61	2295	208800
	G10	healthy	85	2295	208800
	G11	healthy	236	2295	208800
	G12	healthy	59	2295	208800
	G13	healthy	15	2295	208800
	G14	healthy	151	2295	208800
	G15	healthy	79	2295	208800
Total 120/13 GPS 30/32 BDS 43/50 GLO 24/24 GAL 23/25					
NAV		SP3			

Click SP3 button to view the precise ephemeris.



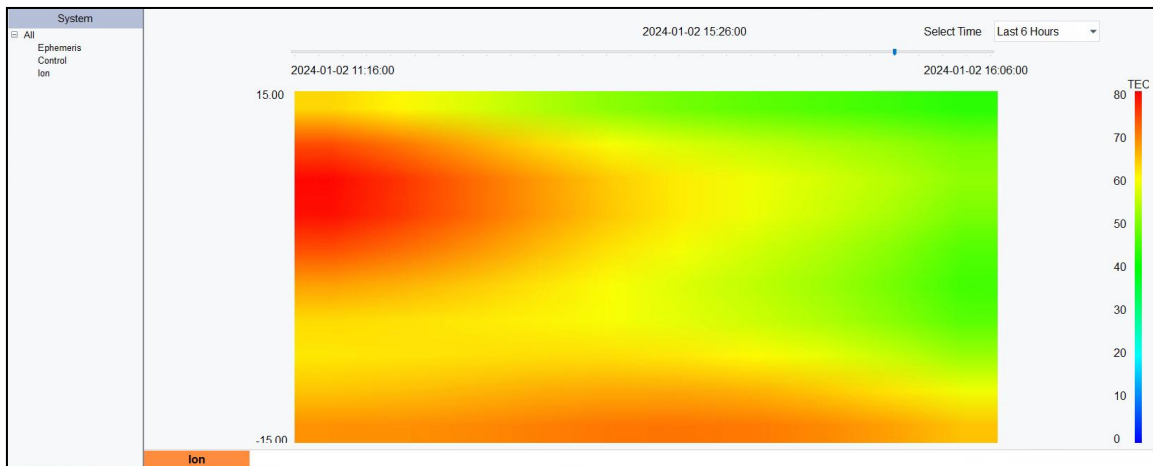
4.8.2 Control

Click Control to view the computer's running memory, CPU, and memory usage of each hard disk.



4.8.3 Ion

After making relevant ionospheric settings in chapter 4.2.7, the ionospheric map will generate the corresponding ionospheric situation map according to the settings. It supports viewing the current time, the last hour, the last day and other variety ranges. You can view the ionospheric layer by pulling the timeline slider.



4.9 Statistics menu bar

4.9.1 Base statistics

Click Statistics on the left taskbar to view the statistics of the base station and rovers.

Statistics		Start Time	12/28/2023 11:16 AM	End Time	1/2/2024 11:16 AM	query		
All Base Statistics Rover Statistics	ID	Name	Offline Times	Offline duration(min)	Online duration(min)	Number of rover connections	Base Stability(Red:Offline Green:Online)	
	1	A31C02015	2	1.17	7198.82	0		
	2	A31C02216	3	0.92	7199.07	0		
	3	A31C02014	2	1.20	7198.78	0		
	4	A31C02252	3	1.03	7198.95	0		
	5	A31C02266	3	1.05	7198.93	0		
	6	A31C02205	6	13.32	7186.67	0		
	7	A31C02039	3	0.97	7199.02	0		
	8	A31C02024	3	0.92	7199.07	0		
	9	A31C02238	3	1.08	7198.90	0		
	10	A31C02093	3	1.10	7198.88	0		
	12	A31C02029	3	1.07	7198.92	0		
	13	A31C02027	3	0.92	7199.07	0		
	14	A31C02018	3	1.10	7198.88	0		
	15	A31C02196	2	5789.35	1410.63	0		
	16	A31C02182	3	0.93	7199.05	0		
	17	A31C02035	2	5789.35	1410.63	0		
	18	A31C02261	3	1.12	7198.87	0		
	19	A31C02021	4	101.43	7098.55	0		

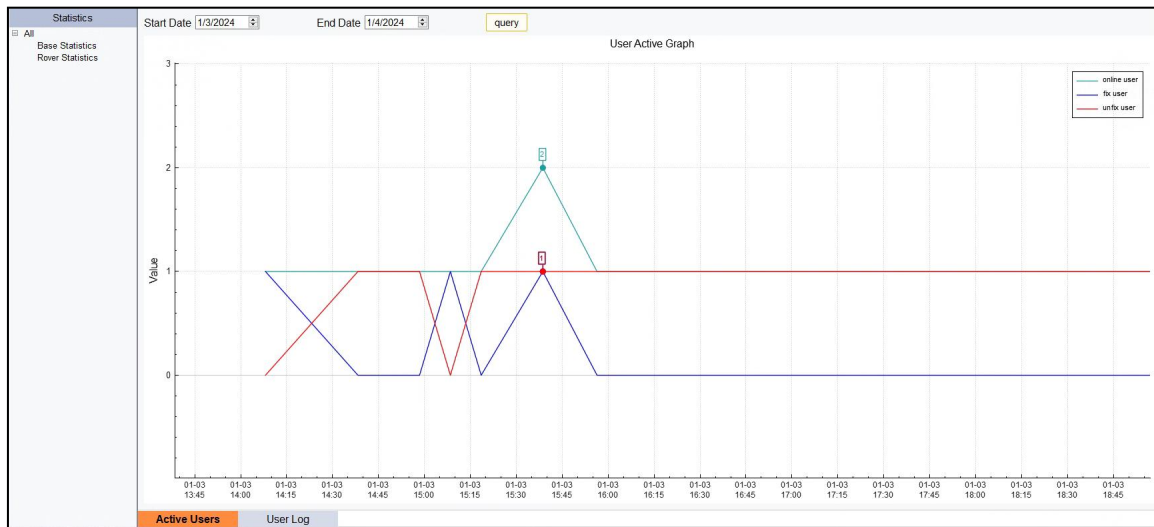
Click base statistics, set the starting time to be counted, click query, and you will be able to view the number of offline times, offline duration time, online duration time, and the total number of connected rovers of each base station. Red means offline, green means online.

4.9.2 Rover statistics

Click rover statistics, set the starting time to be counted, click query, you will be able to query active users and user logs, which shows the current online users, fixed users and Unfixed users.

The vertical axis of the coordinate axis shows quantity, and the horizontal axis shows time. The user can place the cursor on the horizontal axis and slide left or right to switch time and scroll the mouse to zoom in and out on the vertical axis.

As shown below, around 15:40, the number of online users is 2, the number of fixed users is 1, and the number of unfixed users is 1



Click User Log, set the starting time to be counted, click query, and you will be able to query the user's log information.

Statistics

All

Base Statistics

Rover Statistics

Start Date

1/2/2024

End Date

1/3/2024

query

ID	Time	Level	Event	Description
0	2024-01-02 15:46:04	Warn	User Login Fail	Client login failed:mountpoint is empty, ip: port:11529104, channelId:4295028670.
1	2024-01-02 15:46:10	Info	User Logout	Client logoutget mountpoint timeout, user: 3s no data, channelId:1.
2	2024-01-02 15:46:10	Info	User Logout	Tcp close, user, ip:192.168.1.129, port:61374, channelId:1, close type:active.
3	2024-01-02 15:47:13	Warn	User Login Fail	Client login failed:mountpoint is empty, ip: port:11529104, channelId:8589995980.
4	2024-01-02 15:47:20	Info	User Logout	Client logoutget mountpoint timeout, user: 3s no data, channelId:2.
5	2024-01-02 15:47:20	Info	User Logout	Tcp close, user, ip:192.168.1.129, port:61388, channelId:2, close type:active.
6	2024-01-02 15:47:25	Info	User Login Success	[192.168.1.129:61390]1hour login success, mountpoint M300_pro_nearest
7	2024-01-02 15:47:26	Info	User Connect Station ID	21
8	2024-01-02 15:52:02	Info	User Logout	Tcp close, user:1hour, ip:192.168.1.129, port:61390, channelId:3, close type:passive.
9	2024-01-02 15:52:08	Info	User Login Success	[192.168.1.129:61430]1hour login success, mountpoint M300_pro_nearest
10	2024-01-02 15:52:09	Info	User Connect Station ID	21
11	2024-01-02 15:52:17	Info	User Logout	Tcp close, user:1hour, ip:192.168.1.129, port:61430, channelId:4, close type:passive.
12	2024-01-02 15:52:28	Warn	User Login Fail	Client login failed:mountpoint is empty, ip: port:11529104, channelId:21474897914.
13	2024-01-02 15:52:35	Info	User Logout	Client logoutget mountpoint timeout, user: 3s no data, channelId:5.
14	2024-01-02 15:52:35	Info	User Logout	Tcp close, user, ip:192.168.1.129, port:61434, channelId:5, close type:active.
15	2024-01-02 15:52:41	Info	User Login Success	[192.168.1.129:61436]1hour login success, mountpoint M300_pro_SRTK
16	2024-01-02 15:56:45	Info	User Logout	Tcp close, user:1hour, ip:192.168.1.129, port:61436, channelId:6, close type:passive.
17	2024-01-02 15:56:47	Info	User Login Success	[192.168.1.129:61441]1hour login success, mountpoint M300_pro_nearest

Active Users

User Log

Appendix

1. Mount point connected to PPP: SSRA00CNE0 (introducing precision ephemeris to generate base offset monitoring, ionosphere, troposphere and other data). Mount point connected to SPP: RTCM3EPH-MGEX (Introducing broadcast ephemeris, even if all base stations do not have ephemeris, normal single-point positioning and VRS calculation can still be performed), users can check the rawdata of the precise ephemeris in chapter 4.3.1.

2. Ionosphere: The ionosphere refers to the atmosphere above the earth at a height between 50-1000km from the ground. The gas molecules in the ionosphere are radiated by various rays from the sun and other celestial bodies, causing strong ionization to form a large number of free electrons and positive ions. When a GPS signal passes through the ionosphere, like other electromagnetic waves, the signal's path will bend and its propagation speed will change. Therefore, the distance obtained by multiplying the propagation time of the signal by the speed of light in vacuum will not be equal to the geometric distance seen from the satellite to the receiver. This deviation is called the ionospheric refraction error.

3. Troposphere: The troposphere is the lower layer of the atmosphere with an altitude below 40km. Its atmospheric density is greater than that of the ionosphere, and its atmospheric conditions are more complex. The troposphere is in contact with the ground and receives radiant heat energy from the ground. Its temperature decreases with increasing height. When the GPS signal passes through the troposphere, the propagation path is also bent, thereby causing a deviation in the measured distance difference. This phenomenon is called tropospheric refraction. The impact of the troposphere is related to the altitude angle of the signal. When it is in the zenith direction (elevation angle is 90°), its impact can reach 2.3m; in the ground direction (elevation angle is 10°), its impact can reach 20m.

4. i95 curve: The ionospheric i95 index refers to the height in the ionosphere where the ionization rate reaches 95%. The ionospheric i95 index is one of the important indicators to measure the degree of ionospheric activity. When ionospheric activity is strong, the i95 index will increase, which means that the number of charged particles in the ionosphere

increases, the impact on radio communications and navigation systems will also be enhanced, and the accuracy of the navigation system will also be reduced.

5. In general, GLONASS Pseudorange and PhaseRange measurements can be affected by different receiver-dependent biases. An offset of this so-called code-phase bias (CPB) between the reference and rover receivers will manifest as frequency-dependent biases in the corresponding GLONASS double-difference PhaseRange measurements. The magnitude of these inter-frequency biases may adversely affect ambiguity resolution, especially when 3rd party reference receivers are involved. This message provides information which is intended to compensate for the first-order inter-frequency PhaseRange biases introduced by the reference receiver CPB.

The content of message 1033 is commonly used in practice by the decoder to first identify and then compensate for the expected GLONASS receiver-dependent biases present in observation messages 1009-1012. Although this method has proven relatively reliable, 1033 was not developed specifically for this purpose and has several limitations. Message 1230 has been developed to improve GLONASS interoperability. Therefore, if a data stream contains both messages 1230 and 1033 then the content of 1230 takes precedence over the expected GLONASS receiver biases indicated by the receiver description in 1033.

6. RTCM1030: GPS Network RTK Residual Message, this message provides per-SV non-dispersive interpolation residual data for the SVs used in a GPS network RTK system.

RTCM1031: GLONASS Network RTK Residual , this message provides per-SV non-dispersive interpolation residual data for the SVs used in a GLONASS network RTK system.