

Calibration Guide of VCHD8000-TC Tracking Camera



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Camera Calibration



Calibration software is installation-free. Double click software icon to start calibration.

1.1 Teacher

Step 1:

Enter the IP address showed in Fig.1 to connect the feature camera and the panorama camera and then click "Stop Track" to start calibration. See Fig. 1.

Teacher Student Board Director	
	Feature IP 192.168.100.181 Connect
	× 1 ×
	← Home →
	Zoom in Zoom out
	Set Pano (Preset 0) (Preset 0)
	Set Platform (Preset 1) Call Platform (Preset 1) e
	Pano IP 192.168.100.182 Connect P Basic Settings
	Sensitivity: L 2 H >
	Feature size: 🞧 💶 1.0 🖓 유
	Distance: 6.7 M
	Pan offset: L +5 R
	Tilt offset: D
	Obtain Apply(*) Default
Region Settings	
Show ● Track Shield ✓ 1 ✓ 2 3 4 5 6 7 8	Start Track Stop Track
Language English 👻	

Fig. 1 Camera IP Address

Step 2

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Fig. 2 Preset Position Settings

Step 3:

Adjust parameters in "Basic Settings" and click the "Apply" button to take effect. See Fig.3.

- Sensitivity: sets tracking range and response speed for the camera based on 0~4; default value: 2.
- Feature Size: sets view range of the feature cameras; setting range: 0.5~2.0; default value: 1.0.
- **Distance**: sets horizontal distance between the teacher camera and the podium; setting range: 3.0~20.0m; default value: 6m.
- Pan Offset: sets camera horizontal range -200~+200 (steps), 0.069° /step; Left offset:
 -200~0; Right offset: 0~200; default value: 0.
- Tilt Offset: sets camera vertical range -200~+200 (steps), 0.069° /step; Down offset:
 -200~0; Up offset: 0~200; default value: 0.





Fig. 3 Basic Settings for Teacher Camera

Step 4:

Tracking area and shield area settings:

Tracking area settings: tick "Show" box and select "Track". Click LMB (left mouse button) to make a start point and hold LMB to draw the tracking area. See Fig.4.

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Shield area settings: shield area is used to screen interference sources in the tracking area; up to 8 shield areas are supported. Check "Show" box and select "Shield"; click LMB (left mouse button) to make a start point and hold LMB to draw shield areas. See Fig.5.

P.S. A portion of tracking area should be kept beneath shield areas; shield areas cannot set on the left and right borders of tracking areas.

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Fig. 5 Shield Area

Step 5:

Advanced settings: click "expand" to access advanced settings.

Panorama scene camera calibration: check "Show calibration cross" box to show the calibration cross on the screen. Use PTZ to control camera positions and make sure the center point of feature scene camera and panorama scene camera are converged. Then click "Calibration" to calibrate cameras; click "Reset" to get back to calibrated positions. See Fig. 6.

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Fig. 6 Calibration of Camera Position

Navigate Key Action: PTZ mode and menu mode are available. In the menu mode, select "Feature" or "Pano" camera and click "Menu" button to show camera OSD (on-screen display) menu. See Fig. 7 and Fig. 8; in the menu mode, the feature camera can be controlled manually.

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Fig. 7 Navigate Key Action



Fig. 8 Menu Preview

Target Lost Action: set up feature camera action after target is lost. Three actions can be selected: None action, Pano (Preset0), Platform (Preset 1).





Timeout: execute **Target Lost Action** after Timeout when target is lost; setting range: 0-15s; default value: 3s. See Fig. 9.



Fig. 9 Target Lost Action

Multi Objective Action is used to set up the tracking status when there are multiple targets in teachers tracking area. Two actions can be selected: Track moving objective and Return Pano. When teacher numbers reduced from multiple targets to single target, cameras need 5 seconds delay before tracking single target. See Fig. 10.

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Tracking Config Tools v2.1.9		
	Feature IP 192.168.100.181 Disconnect	Pano Lens Pos Calibration Cc 4 V Show calibration cross Reset Calibration Navigate Key Action • PTZ mode Menu mode Feature V Menu Action Multi Objective Action 4 track moving object • Return pano
Region Settings	Pano IP 192.168.100.182 Disconnect Basic Settings Sensitivity: L 2 H Feature size: 2 H Distance: 6.7 M Pan offset: L 4.5 R Tilt offset: D 0 U Obtain Apply(*) Default	Track Settings Image: Tracking on starting up Auto zoom Disable AF when tracking Vertical tracking All-process tracking Param Backup Export Open Import Version Info Feature Info: SOC 72.22
Language English v	Start Hidtk Stop Hidtk	Pano Info: SOC 6.2.23

Fig. 10 Multi Objective Action

Track Settings is used to set up the operation mode of tracking cameras. Five operation modes are available: Tracking on starting up, Auto zoom, Disable AF when tracking, Vertical tracking and All-process tracking. Operation mode takes effect after checking " \checkmark ". See Fig. 11.

Tracking Config Tools v2.1.9	
Teacher Student Board Director	
	Feature IP 192.168.100.181 Disconnect
	★ ↑ ★ Reset Calibration
	← Home → Navigate Key Action
	V V Menu mode
4 N3 2 M	Zoom in Zoom out Feature * Menu
	Set Pano Call Pano Action Multi Objective Action
	(Preset 0) (Preset 0) track moving object
	(Preset 1) (Preset 1) < (Preset 1)
	Pano IP 192.168.100.182 Disconnect Disconnect
· · · · · · · · · · · · · · · · · · ·	Basic Settings d ✓ Iracking on starting up
	Sensitivity: L 2 H Disable AF when tracking
	Distance: 6.7 M All-process tracking
	Pan offset: L+5 R Param Backup
	Tilt offset: D0 U Export
	Open Open
The second secon	Obtain Apply(") Default Import
Show Image: Track Shield Shield Shield Shield <td>Start Track Stop Track Version Info Feature Info: SOC 7.2.22 Pano Info: SOC 6.2.23</td>	Start Track Stop Track Version Info Feature Info: SOC 7.2.22 Pano Info: SOC 6.2.23
Language English 👻	

Fig. 11 Tracking Settings

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Param Backup is used to import and export setting parameters of feature cameras to Simplify setting operations under similar conditions. See Fig. 12.

Export: when camera stops tracking, click "Export" to backup tracking parameters. Click "Open" to show file path.

Import: when camera stops tracking, click "Open" and select a parameter file. Then click "Import" to import the file.



Fig. 12 Parameter Backup

Version Info is used to show version information of feature and pano cameras. See Fig. 13.

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Z Tracking Config Tools v2.1.9					_ _ ×
Teachar Student Reard Director					
	Feature IP 192.168	8.100.18	Disconnect		Pano Lens Pos Calibration Cc 4
		1			Reset Calibration
		lome			PTZ mode Menu mode
		ţ			Fortuna and Manual
#N3/m	Zoom in		Zoom out		reature • Mienu
	Set Pano		Call Pano		Action Multi Objective Action
	(Preset 0)		(Preset 0)		⊖ track moving object
	(Preset 1)		(Preset 1)	<	Return pano
	Pano IP 192.168 Basic Settings Sensitivity: L = Feature size: 0 = Distance: =		2 Disconnect	f o I d d M M	Track Settings Tracking on starting up Auto zoom Disable AF when tracking Vertical tracking All-process tracking
	Pan offset: L 💳	0)	R	Param Backup
	Tilt offset: D 💳	-0	0	U	Export
	Obtain Ap	oply(*)	Default		Open Import
Region Settings				-	Version Info
Show ● Track Shield ✓ 1	Start Track		Stop Track		Feature Info: SOC 7.2.22 Pano Info: SOC 6.2.23
Language English 👻					

Fig. 13 Version Information

Step 6:

Start tracking: after finishing step 1 ~5, click "Apply" button for the parameters to take effect. Click "Start Track" for auto tracking. See Fig. 14.

Caracking Config Tools v2.1.9		X
Teacher Student Board Director		
	Feature IP 192.168.100.181 Disconnect	Pano Lens Pos Calibration Cc 4
	× 1 ×	Reset Calibration
	← Home →	Navigate Key Action
		PTZ mode Menu mode
and analyze of	Zoom in Zoom out	Feature Menu
	Set Pano (Preset 0) (Preset 0)	Target Lost Action Multi Obje 4
	Set Platform (Preset 1) Call Platform (Preset 1)	Pano(Preset 0) Platform(Preset 1)
		f Timeout: 2 2
	Pano IP 192.108.100.182 Disconnect	l d ✔ Tracking on starting up
	Sensitivity: L 2 H	< V Auto zoom
	Feature size: 0 1.0 000	Vertical tracking
	Distance: 6.7 M	All-process tracking
A Statement and and and	Pan offset: L	Param Backup
	Tilt offset: D 0 U	
	Obtain Apply(*) Default	Import
Region Settings		Version Info Feature Info: SOC 7.2.22
Show ● Track Shield ✓ 1 ✓ 2 3 4 5 6 7 8	Start Track Stop Track	Pano Info: SOC 6.2.23
Language English 👻		

Fig.14 Start Track

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Student

Step 1:

Enter the IP address showed in Fig.15 to connect the feature camera and the panorama camera and then click "Stop Track" to start calibration. See Fig. 15.

Z Tracking Config Tools v2.1.9	
Teacher Student Board Director	
	Feature IP 192.168.100.191 Connect
	× ↑ ×
	← Home →
	Zoom in Zoom out
	Set Pano 0 (Preset 0) Call Pano 0 (Preset 0)
	Set Pano 1 (Preset 1) Call Pano 1 (Preset 1) e
	Pano IP 192.168.100.192 Connect a
	Basic Settings d
	Sensitivity: L 2 H >
	Pan offset: L 0 R
	Tilt offset: D 0 U
	Input H: 2.2 d: 6.0 h: 0.0
	Obtain Apply(*) Default
Region Settings	
Show Track Shield 1 2 3 4 5 6 7 8	Start Track Stop Track
Language English 👻	

Fig. 15 Camera IP Connection

Step 2:

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Fig. 16 Preset Position Settings

Step 3:

Adjust parameters in "Basic Settings" and click the "Apply" button to take effect. See Fig. 17.

- Sensitivity: sets tracking range and response speed based on different tracking targets: for primary school students and junior high school student, set value to 3~4; for senior high school students, set value to 2; for college student, set value to 0 or 1. Default value: 2.
- Feature Size: sets view range of the feature camera; setting range: 0.5~2.0; default value: 1.0.
- Pan Offset: sets camera horizontal range -200~+200 (steps), 0.069° /step; Left offset:
 -200~0; Right offset: 0~200; default value: 0.
- Tilt Offset: sets camera vertical range -200~+200 (steps), 0.069° /step; Down offset:
 -200~0; Up offset: 0~200; default value: 0.
- Input:
 - H panorama camera install height;
 - h objects height;
 - d horizontal distance of objects from the camera.

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Fig. 17 Basic Settings for Student Camera

Step 4:

Shield area settings:

Shield area settings: tick "Show" box and select " \checkmark " in the shield area box such as box 1. Click left border of shield area 1 with LMB (left mouse button) and hold LMB in anti-clockwise direction to right border. See Fig. 18.

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Step 5:

Fig. 18 Shield Area

Advanced settings: click "expand" to access advanced settings.

Panorama camera calibration: check "Show calibration cross" box to show the calibration cross on the screen. Use PTZ to control camera positions and make sure the center point of feature scene camera and Panorama camera are converged. Then click "Calibration" to calibrate cameras; click "Reset" to get back to calibrated positions. See Fig. 19.

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Fig. 19 Calibration of Camera Position

Navigate Key Action: PTZ mode and menu mode are available. In the menu mode, select "Feature" or "Pano" camera and click "Menu" button to show camera OSD (on-screen display) menu. See Fig. 20; in the menu mode, the feature camera can be controlled manually.



Fig. 20 Navigate Key Action

Target Lost Action: set up feature camera action after target is lost. Three actions can be selected: None action, Pano (Preset0), Platform (Preset 1).

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Timeout: execute **Target Lost Action** after Timeout when target is lost; setting range: 0-15s; default value: 0s. See Fig. 21.



Fig. 21 Target Lost Action

Tracking Speed: sets the vertical tracking speed (Tilt Speed) and horizontal tracking speed (Pan Speed) of the feature camera;

Response Time: sets the response time of the tracking camera when a student stands up. Default time: 0.6s. See Fig. 22.

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Fig. 22 Tracking Speed

Lens Param: sets the parameters of panorama camera. "Lens 1" is for 3.6mm lens and "Lens 2" is for 3mm lens. Default lens: lens 1. See Fig 23.



Fig. 23 Lens Type

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Multi Objective Action is used to set up the tracking status when there are multiple students standing up. Three actions can be selected: None action, Small pano, Return pano. Default settings: small pano.

Track Settings is used to set up the operation mode of tracking cameras. Five operation modes are available: Tracking on starting up, Auto zoom, Disable AF when tracking, Vertical tracking and All-process tracking. Operation mode takes effect after ticking " $\sqrt{$ ".

Param Backup is used to import and export setting parameters of the feature camera to simplify setting operations under similar conditions.

Export: when camera stops tracking, click "Export" to backup tracking parameters. Click "Open" to show file path.

Import: when camera stops tracking, click "Open" and select a parameter file. Then click "Import" to import the file.

Config Tools v2.1.9 Teacher Student Board Director Pano Lens Pos Calibration Cc 4 🕨 Feature IP 192.168.100.191 Disconnect ✓ Show calibration cross Reset Calibration 1 Navigate Key Action Home PTZ mode
 Menu mode Ļ * Feature * Menu Zoom in Zoom out Tracking Speed Lens Param 4 Set Pano 0 Call Pano 0 (Preset 0) (Preset 0) Lens 2 👻 Max Angle 91 Set Pano 1 (Preset 1) Call Pano 1 Pan Correction 1800 (Preset 1) Tilt Correction 2000 Multi Objective Action Pano IP 192.168.100.192 Disconnect O None action d Basic Settings Small pano L = 0 H Sensitivity: O Return pano Feature size: 🜔 💳 _____ Track Settings R Pan offset: L ✓ Tracking on starting up D = __ 0 U Tilt offset: -Param Backup Export Input H: 2.2 d: 7.2 h: 0 Open Obtain Apply(*) Default Import Version Info Region Settings Feature Info: SOC 7.2.23 Start Track Stop Track ✓ Show ○ Track ● Shield ✓ 1 ✓ 2 ✓ 3 ✓ 4 5 6 7 8 Pano Info: SOC 6.2.23 Language English +

Version Info is used to show version information of feature and pano cameras. See Fig. 24.

Fig. 24 Version Information

Step 6:

Start tracking: after finishing step 1 ~5, click "Apply" button for the parameters to take effect. Click "Start Track" for auto tracking. See Fig. 25.

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Fig. 25 Start Tracking

1.3 Director

Director settings are used to configure the communication parameters among teacher camera, student camera and board system. In order to set Director parameters, it is required to enter the board system IP and receiving port number as well as the communication commands among teacher camera, student camera and board system.

Step 1:

Set up communication protocols, command formats and director strategies, etc. See Fig. 26.

Port: when the UDP is selected as the communication protocol, the default port number is 8791 (no adjustment is permitted).

Baudrate: when the serial port is used for the communication protocol, the baudrate of the serial port is 9600K bps (no adjustment is permitted).

Protocol: the communication between the camera and the director system can be serial port or network. It is required to select one from UDP, TCP or serial port. Default setting: UDP.

Command Type:

It is used to select the type format between the camera and the director system. Support hexadecimal or character string for your free choice. Default format: hexadecimal.

Director Server: configure director system's IP address and receiving port. Default address: 192.168.100.66; default port: 9999.

Director Code Send Mode is used to select sending times of director code: Single, Triple and Continuously.

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acher Student Boa	rd Director		
Communication Settings Camera Teacher IP Student IP Board IP	Port 879: 0.192 Using UART Baudrate 960	Command Typ	e ASCII Director Server Director Server IP Address 192.168.100.77 Port 9999
Tracking Switch Switch Auto Switch Manual	FF 00 00 00 00 01 FF 00 00 00 00 02	Directo	or Code Send Mode
Director Strategy			
External Director	Appear	Disappear	 Interior Director
Teacher ✓ On the platform ✓ Teacher still ✓ Teacher moving	FF 01 00 00 00 11 FF 01 00 00 00 12 FF 01 00 00 00 13	FF 01 00 00 01 11 FF 01 00 00 01 12 FF 01 00 00 01 13	Director Code(Only Teacher Camera) Image: Construction of the state of
✓ Under the platform ✓ Multi objective	FF 01 00 00 00 14 FF 01 00 00 00 15	FF 01 00 00 01 14 FF 01 00 00 01 15	 ✓ Student pano ✓ Student feature ✓ FF 44 44 ✓ Blackboard ✓ FF 55 55
Student ✓ Student stood up	FF 02 00 00 00 21	FF 02 00 00 02 21	Min Switch Time 3 S (Except for the student pano)
reature in place Student sat down	FF 02 00 00 00 22	FF 02 00 00 02 23	
	FF 02 00 00 00 24	FF 02 00 00 02 24	
Blackboard Have action	FF 03 00 00 00 31	FF 03 00 00 03 31	
	Obtain	Apply	Default

Fig. 26 Director Parameter Settings

Step 2:

Select director mode and fill in director strategy. Default setting: Interior Director. See Fig. 27. **Switch Auto**: when "Switch Auto" is selected, the tracking mode is switched to automatic tracking. Default value: ff 00 00 00 00 01 (adjustment is available).

Switch Manual: when "Switch Manual" is selected, the tracking mode is switched to manual tracking. Default value: ff 00 00 00 00 02 (adjustment is available).

Director Strategy:

External Director: the board camera, the student camera and the teacher camera will send

current status codes to the director system independently. For example: board camera has two status (action, no action); student camera has four status (stand up, take a seat, sit down and multiple targets); teacher camera has five status (step on the stage, no move, move, step down the stage, multiple targets). The director system needs to collect status from three cameras for directing the broadcast. For example, when the teacher steps on the stage, the PRM displays teacher's feature scene; when the teacher steps down the stage, the PRM displays student's panorama scene; when a student stands up, the PRM displays student's feature scene; when multiple students stand up, the PRM displays student's panorama scene.

Interior Director: the teacher camera will receive the status of board camera, student camera

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and teacher camera and send switch codes to the director system for broadcast. The director system needs not to judge current status. That is, when there is movement in board camera, the camera will send board switch code. If there is no movement in board camera, the system will judge if there is movement in student's camera and finally judge if there is movement in teacher's camera.

Min Switch Time: when the minimum switch time is locked, the broadcast image can switch to images with higher priority. Student feature scenes will not be processed.

Communication Settings Camera Teacher IP Student IP Board IP	Port 879 0.192 Using UART Baudrate 960	1 Protocol • UDP · · · · · · · · · · · · · · · · · · ·	e ASCII Director Server
Tracking Switch Switch Auto Switch Manual Director Strategy	FF 00 00 00 00 01 FF 00 00 00 00 02	Directo	or Code Send Mode
O External Director	Appear	Disappear	Interior Director
Teacher ✔ On the platform	FF 01 00 00 00 11	FF 01 00 00 01 11	Director Code(Only Teacher Camera)
 ✓ Teacher still ✓ Teacher moving 	FF 01 00 00 00 12 FF 01 00 00 00 13	FF 01 00 00 01 12 FF 01 00 00 01 13	✓ Teacher feature FF 22 22
✔ Under the platform✔ Multi objective	FF 01 00 00 00 14	FF 01 00 00 01 14	Image: Student pano FF 33 33 Image: Student feature FF 44 44
Student			■ V Blackboard FF 55 55
Student stood up	FF 02 00 00 00 21	FF 02 00 00 02 21	Min Switch Time 3 S (Except for the student pano)
✓ Feature in place	FF 02 00 00 00 22	FF 02 00 00 02 22	
✓ Student sat down	FF 02 00 00 00 23	FF 02 00 00 02 23	
✔ Multi objective	FF 02 00 00 00 24	FF 02 00 00 02 24	
Blackboard ✓ Have action	FF 03 00 00 00 31	FF 03 00 00 03 31	

Fig. 27 Interior Director

Step 3:

After setting is complete, click "Apply" for the parameters to take effect. See Fig. 28.

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acking Config Tools v2.1	.9 rd Director			
Communication Settings Camera Teacher IP Student IP Board IP racking Switch	Port 879 0.192 Using UART Baudrate 960	00	Protocol UDP Command Type HEX Directo	TCP Serial Director Server IP Address 192.168.100.77 Port 9999 Code Send Mode
Switch Auto Switch Manual	FF 00 00 00 00 02			Single 🔿 Triple 🔷 Continuously
Director Strategy	Appear	Di	sappear	Interior Director
Teacher ✓ On the platform ✓ Teacher still ✓ Teacher moving ✓ Under the platform ✓ Multi objective	FF 01 00 00 00 11 FF 01 00 00 00 12 FF 01 00 00 00 13 FF 01 00 00 00 14 FF 01 00 00 00 15	FF 01 FF 01 FF 01 FF 01 FF 01 FF 01	00 00 01 11 00 00 01 12 00 00 01 13 00 00 01 14 00 00 01 15	Director Code(Only Teacher Camera) ✓ Teacher pano FF 11 11 ✓ Teacher feature FF 22 22 ✓ Student pano FF 33 33 ✓ Student feature FF 44 44 ✓ Blackboard FF 55 55
Student Image: Student stood up Image: Stude stood up Image: Stude stood	FF 02 00 00 00 21 FF 02 00 00 00 22 FF 02 00 00 00 23 FF 02 00 00 00 24	FF 02 FF 02 FF 02 FF 02 FF 02 FF 02	00 00 02 21 00 00 02 22 00 00 02 23 00 00 02 24	Min Switch Time 3 S (Except for the student pano)
Blackboard	FF 03 00 00 00 31	FF 03	00 00 03 31	

Fig. 28 Setting Complete

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2. Precautions

- 1. After setting the parameters, it is required to click "Apply" button for the system to take effect. Otherwise the changed parameters will not work.
- 2. A portion of tracking area should be kept beneath teacher shield areas; shield areas cannot set on the left and right borders of tracking areas. Otherwise when the teacher leaves the tracking area from shield area, the target will not lose.



Correct Settings



Wrong Settings

- 3. When the teacher enters shield area, the camera will stop tracking after 30s; when there is teacher in the tracking area, the camera will lose target in shield area. When there are multiple teachers in the tracking area, if the parameter is set to "Return Pano", then the tracking position will return to panorama 0 or feature 1 (optional). It will take 5 seconds delay from multiple teachers tracking to single teacher tracking.
- 4. The user should set Sensitivity based on different people. The default value is 0, which is suitable for adults.

3. Firmware Update

Please refer to V6 Network Update Guide.

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