Brief Analysis of AC Push Protocol

Push protocol is a data protocol defined on the basis of the **HTTP** protocol.

1. Connection Process

1.1 Access control Push (AC Push)

The request url address starts with http://ip:port/iclock, and all request starts with iclock, so /iclock can be defined as a global variable while developing.

(1) the request of initialization GET /iclock/cdata

(2) the request of registration /iclock/registry

(3) the request of Push and download configuration parameters /iclock/push

(4) the request of heartbeat /iclock/getrequest

(5) upload data POST/iclock/cdata

(6) backup heartbeat /iclock/ping

(7) the returns result of uploading command /iclock/devicecmd

The above 7 steps are the basic connection process. And there are also extended interfaces, such as the interface of querying data is /iclock/querydata, etc.

The 7-step interface of the parsing connection process:

(1) The request of initialization: After configuring the cloud server address and port, the device will actively send the request of initialization to the server, and the server reply 200 OK based on the request.

(2) The request of registration: After the device initialization request is passed, the device will send the request of registration and the server needs to reply with a 10-digit random number as the registration code and the server will decide by itself.

(3) The request of Push: The device sends the request of Push to server to download configuration parameters of the server.

ServerVersion=3.0.1

ServerName=ADMS

PushVersion=3.0.1

ErrorDelay=30

RequestDelay=2

TransTimes=00:0014:00

TransInterval=1

TransTables=User Transaction

Realtime=1

SessionID=30BFB04B2C8AECC72C01C03BFD549D15

TimeoutSec=10

Documentation has detailed parsing of each parameter!!

(4) The request of heartbeat: The request of heartbeat is a sign that the client device and server software keep online, after the above three interactions, the interaction is completed, and the device can be connected normally. For the request of heartbeat, the server reply OK.

(5) Upload data: The request to upload data is the post request with the request entity attached, including upload real-time records (rtlog), upload real-time state (rtstate), upload registered user information, upload face comparison photos (biophoto), upload fingerprint template, upload snapshot, etc. After receiving the upload information, the server reply OK.

When Realtime is 1 in the request of Push, it is real-time uploading;

When Realtime is 0 in the request of Push, it is timed uploading.

The second case: The punch records and registration information generated during the offline period of the device will push the offline records after the device communicates with the server normally. And the function is similar to ZKBioSecurity software.

(6) Backup heartbeat: The /iclock/ping interface is an backup heartbeat request for getrequest interface and this request only reply OK.

Function: It is used to keep heartbeat with the server. When processing large data uploads, use ping to keep the heartbeat, and after the big data is processed, use getrequest to keep the heartbeat.

(7) The returns result of uploading command: After the command issued by the server ends, the device will return the execution result to inform the server of the execution of the command. This interface reply OK.

The above steps are the completion basic interaction of the device.

2. Command issuing process

The command is issued through the interface of /getrequest. Let's learn about our Push protocol, it is HTTP protocol, and it is a short connection, each time the heartbeat comes, the connection will be disconnected, and the connection will be established again after the next heartbeat. And it has three times handshake interaction of HTTP in inner.

Commands issuing divide into:

(1) Update issued \update data

(2) Delete delete data

(3) Query get data

(4) Count statistical data

(5) ACCOUNT check data

(6) CONTROL DEVICE control command

(7) SET OPTIONS, GET OPTIONS set, get parameters command

2.1 Update command

Update command is subdivided into 32 tables. Regarding access control, we will mainly introduce three tables: user, timezone, access control privilege.

2.1.1 issue user

```
C:${CmdID}:DATA$(SP)UPDATE$(SP)user$(SP)CardNo=${XXX}$(HT)Pin=${XXX}$(HT)Password=${XXX}$(HT)Group=${XXX}$(HT)StartTime=${XXX}$(HT)EndTime=${XXX}$(HT)Name=${XXX}$(HT)Privilege=${XXX}
```

As shown in the figure, this is the command of issuing user, CmdID is command id. During development, CmdID should not be 0, and increment from 1. It is similar with ZKBioSecurity, the length of CmdID is 32 bytes, and it is recommended to set as unique non-repeatable, so that it is convenient to troubleshoot problems.

(SP) is a space, (HT) is \t , and you can refer to the definition in Chapter 5 in the document.

2.1.2 issue time rule

```
C:${CmdID}:DATA$(SP)UPDATE$(SP)timezone$(SP)TimezoneId=${XXX}$(HT)SunTime1=${XXX}$(HT)SunTime2=${XXX}$(HT)SunTime3=${XXX}$(HT)MonTime1=${XXX}$(HT)MonTime2=${XXX}$(HT)MonTime3=${XXX}$(HT)TueTime1=${XXX}$(HT)TueTime2=${XXX}$(HT)TueTime3=${XXX}$(HT)WedTime1=${XXX}$(HT)WedTime2=${XXX}$(HT)WedTime3=${XXX}$(HT)ThuTime1=${XXX}$(HT)ThuTime2=${XXX}$(HT)ThuTime3=${XXX}$(HT)FriTime1=${XXX}$(HT)FriTime2=${XXX}$(HT)FriTime3=${XXX}$(HT)SatTime1=${XXX}$(HT)SatTime2=${XXX}$(HT)SatTime3=${XXX}$(HT)Hol1Time1=${XXX}$(HT)Hol1Time2=${XXX}$(HT)Hol1Time3=${XXX}$(HT)Hol2Time1=${XXX}$(HT)Hol2Time2=${XXX}$(HT)Hol2Time3=${XXX}$(HT)Hol3Time1=${XXX}$(HT)Hol3Time2=${XXX}$(HT)Hol3Time3=${XXX}
```

This command is to issue time rule, and TimezoneId can't be 0 or special symbol.

Its value is 1 by default, which means that it can be accessed for 24 hours.

Time period analysis: for example, 8:30~12:00, after converted, is (830<< 16 +1200), which is 0x33e04b0.

<< is the left-shift symbol , 830 left-shift 16 bits + 1200 or, 830*65536+1200=54396080

Example: MonTime1=54396080 means people can access from 8:30-12:30 on Monday.

2.1.3 issue biophoto

```
C:${CmdID}:DATA${SP}UPDATE${SP}biophoto${SP}PIN=${XXX}${HT}Type=${XXX}${HT}Size=${XXX}${HT}Content=${XXX}${HT}Format=${XXX}${HT}Url=${XXX}${HT}PostBackTmpFlag=${XXX}
```

This command is to issue biophoto.

Emphasize: Only when Type= 9 can the biophoto be sent.

When you registered the biophoto from device and then upload to server, the value of Type is 0, because it is an all-purpose value.

But if you are issuing the biophoto from server, the Type must be 9. Also, for the Size, it is the length of base64, and no deviation is allowed.

If it is in url form, it is a relative path.

For example: The path where the biophoto stored locally is:

E:\v5000\BioServer\service\zkbiosecurity\BioSecurityFile\upload\pers\user\cropface\1

Then, the relative path is upload/pers/user/cropface/1/a.jpg.

You can refer to ZKBioSecurity to issue command.

2.2 Delete command

Note: When switching timezone, for example, if Zhang san's timezone is 1 and wants to switch to 2, then the command of update can't be used directly.

You should at first execute the delete command, C:1:DATA DELETE userauthorize Pin=1 to delete the access control of this person and then issue access control privilege,

C:7:DATA UPDATE userauthorize Pin=1 AuthorizeTimezoneId=2 AuthorizeDoorId=1

Note: If you don't execute the delete command before you switch the timezone, Zhang San will have timezone 1 and timezone2.

The command of delete user, C:1:DATA DELETE user Pin=1 , this command is to delete the user whose Pin is 1, and Pin is case sensitive.

2.3 Query command

```
C:${CmdID}:DATA$(SP)QUERY$(SP)tablename=$(XXX),fielddesc=$(XXX),filter=$(XXX)
```

The Query command is used to upload data that fits the query conditions to the server.

Query the person whose pin is 1 in the user table:

C:1:DATA QUERY tablename=user,fielddesc=*,filter=Pin=1

tablename: the name of the table to be queried

fielddesc: means field, when it is *, represents to query all field, otherwise query specified field.

filter: query condition, when it is *, represents not to filter, when this field is NewRecord and tablename is transaction, represents to query new records. Events records can only query new records or all records.

2.4 Other commands

(1) The server issues a command to open door 1 for 5 seconds

C:1:CONTROL DEVICE 01010105

(2) The server issues a command to reboot device

C:223:CONTROL DEVICE 03000000

The format of issuing command is AABBCCDDEE, EE represents operator and it doesn't need to issue. Control command as above.

3. Data upload process

Upload real-time event(rtevent), upload real-time state(rtstate), upload userinfo, upload fingerprint template, upload biophoto, upload snapshot, upload user photo, upload biodata、upload error log.

These upload data processes are all Post requests, with the request entity /iclock/cdata or /iclock/deviceamd and then divided into tablename=user, biophoto, templatev10 and other table information, and all such requests reply OK.

(1) Upload real-time event (rtevent): Access control records are generated on the device, including remote door opening, forces door opening, verification door opening, etc., these events will be pushed.

(2) Upload real-time state (rtstate): Regularly upload some access control status information of the current device to the software or notify the server immediately when some access control status changes.

Firstly, to take a look at the upload real-time status(rtstate) : **relay and alarm**

relay: Represents the relay status, each door occupies a binary bit,

0b0 means the relay is on, 0b1 means the relay is off, the first bit is the relay status of door 1.

Example: The push information is relay=02

The state value pushed as hexadecimal 02 is converted into binary value: 0010. Because each door of the relay occupies one binary bit, so you can know the disconnected state of the relay of door 2.

sensor: represents the sensor state of the door, each door occupies two binary bits, AA means door 1-4, BB means door 5-8, door 1 occupies the first and second bits of the first byte, and so on, 0b00 means that the current door type is set to no door sensor, 0b01 means that the current door is closed (with door sensor), 0b10 means that the current door is open(no door sensor);

Example: The push information is sensor=02

The state value pushed as hexadecimal 02 is converted into binary value:00000010. Because each door occupies two binary bits (from low to high), the result can be known according to 00000010 at this time: Door 1 is in an open state(no door sensor).

(3) When using visible light device, registering the face on the device will upload all-in-one template (biodata), it is recommended that customers to ignore it and only to save biophoto.

(4) Upload command execution result: After the command issued by the server ends, return the execution result to inform the server of the execution of the command.

When the command returns, it will return in the form of CmdID and notify whether the command is successful or not. Therefore, when the command is issued, we suggest that the value of the customer's CmdID cannot be 0. It is better to start from 1 and increase.

ID=1&Return=0&CMD=DATA UPDATE

The above is the analysis and introduction of **AC PUSH**.