# PPCS P2P API

2.2.0

# API

- Common:
  - PPCS_Initialize, PPCS_DeInitialize
  - PPCS_NetworkDetect
  - PPCS_NetworkDetectByServer
  - PPCS_GetAPIVersion
  - PPCS_Share_Bandwidth
  - PPCS_Get_ServerIP
- Device:
  - PPCS_Listen
  - PPCS_Listen_Break
  - PPCS_LoginStatus_Check
- Client:
  - PPCS_Connect
  - PPCS_ConnectByServer
  - PPCS_Connect_Break
- Session:
  - PPCS_Check
  - PPCS_Close
- Read / Write data
  - PPCS_Read
  - PPCS_Write
- Check Buffer size
  - PPCS_Check_Buffer

# Return Code of API

- >=0: Successful
  - #define ERROR_PPCS_SUCCESSFUL 0
- <0: Some thing wrong

|  |  |
|---|---|
| #define ERROR_PPCS_NOT_INITIALIZED | -1 |
| #define ERROR_PPCS_ALREADY_INITIALIZED | -2 |
| #define ERROR_PPCS_TIME_OUT | -3 |
| #define ERROR_PPCS_INVALID_ID | -4 |
| #define ERROR_PPCS_INVALID_PARAMETER | -5 |
| #define ERROR_PPCS_DEVICE_NOT_ONLINE | -6 |
| #define ERROR_PPCS_FAIL_TO_RESOLVE_NAME | -7 |
| #define ERROR_PPCS_INVALID_PREFIX | -8 |
| #define ERROR_PPCS_ID_OUT_OF_DATE | -9 |
| #define ERROR_PPCS_NO_RELAY_SERVER_AVAILABLE | -10 |
| #define ERROR_PPCS_INVALID_SESSION_HANDLE | -11 |
| #define ERROR_PPCS_SESSION_CLOSED_REMOTE | -12 |
| #define ERROR_PPCS_SESSION_CLOSED_TIMEOUT | -13 |
| #define ERROR_PPCS_SESSION_CLOSED_CALLED | -14 |
| #define ERROR_PPCS_REMOTE_SITE_BUFFER_FULL | -15 |
| #define ERROR_PPCS_USER_LISTEN_BREAK | -16 |
| #define ERROR_PPCS_MAX_SESSION | -17 |
| #define ERROR_PPCS_UDP_PORT_BIND_FAILED | -18 |
| #define ERROR_PPCS_USER_CONNECT_BREAK | -19 |
| #define ERROR_PPCS_SESSION_CLOSED_INSUFFICIENT_MEMORY | -20 |
| #define ERROR_PPCS_INVALID_APILICENSE | -21 |
| #define ERROR_PPCS_FAIL_TO_CREATE_THREAD | -22 |

# PPCS_GetAPIVersion

- Function Declare:
  - UINT32 PPCS_GetAPIVersion()
- Description:
  - PPCS_GetAPIVersion: To retrive API version info.
- Parameters:
  - **None**
- Return:
  - 0x01020304 ➔ Version 1.2.3.4

## PPCS_Initialize, PPCS_DeInitialize

- Function Declare:
  - PPCS_Initialize(CHAR *Parameter)
  - INT32 PPCS_DeInitialize()
- Description:
  - PPCS_Initialize: To initialize usage of PPCS session module.
  - PPCS_DeInitialize: To free all resource used by PPCS session module.
- Parameters:
  - **Parameter**: The parameter string that tell server information.
- Return:
  - ERROR_PPCS_SUCCESSFUL
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_ALREADY_INITIALIZED
  - ERROR_PPCS_INSUFFICIENT_RESOURCE

# PPCS_NetworkDetect

- Function Declare:
  - INT32 PPCS_NetworkDetect(st_PPCS_NetInfo *NetInfo, UINT16 UDP_Port);
  - INT32 PPCS_NetworkDetectByServer(st_PPCS_NetInfo *NetInfo, UINT16 UDP_Port, CHAR *ServerString)
- Description:
  - PPCS_NetworkDetect: To detect network related information.
  - PPCS_NetworkDetectByServer: The same as PPCS_NetworkDetect, but user can specify with which server to perform this function.
- Parameters:
  - **NetInfo** : the structure where network iformation is retrived.
  - **UDP_Port** : Specify the UDP port. if **UDP_Port** =0, a random port will be used.
  - **ServerString**: Encoded string, specifying the server address.
- Return:
  - ERROR_PPCS_SUCCESSFUL
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_INVALID_PARAMETER
  - ERROR_PPCS_UDP_PORT_BIND_FAILED

## PPCS_Share_Bandwidth

- Function Declare:
  - INT32 PPCS_Share_Bandwidth(CHAR bOnOff)
- Description:
  - PPCS_Share_Bandwidth: Allow device(those call PPCS_Listen) to provide device relay service, if it is in suitable network condition.
- Parameters:
  - **bOnOff** :
    - bOnOff = 0: Not share, or stop sharing (if is on sharing).
    - bOnOff = 1: Allow bandwidth sharing.
- Return:
  - ERROR_PPCS_SUCCESSFUL
  - ERROR_PPCS_NOT_INITIALIZED

# PPCS_Listen/PPCS_Listen_Break

- Function Declare:
  - INT32 PPCS_Listen(const CHAR *MyID, UINT32 TimeOut_Sec, UINT16 UDP_Port , CHAR bEnableInternet, const CHAR *APILicense)
  - INT32 PPCS_Listen_Break();
- Description:
  - PPCS_Listen: To login to server and wait until some client to connect with. The calling thread will be blocked, till Client connection or timeout.
  - PPCS_Listen_Break: to break PPCS_Listen
- Parameters:
  - **MyID**: My ID
  - **TimeOut_Sec**: Block until Client connection or Time out in Second. Valid timeout value: 60~86400
  - **UDP_Port** : Specify the UDP port. if **UDP_Port** =0, a random port will be used.
  - **bEnableInternet** : If allow Client connection from Internet.
  - **APILicense**: The License string for using this API. Also, used to define CRCKey.

    case 1: APILicense is like "ABCDE:CRCKey", the CRCKey is the CRC Key string that user set in P2P Server.

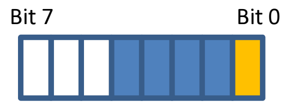
    case 2: APILicense is like "ABCDE", Empty CRC Key is used.
- Return:
  - >=0 , successful and the Session handle is returned.
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_INVALID_PARAMETER
  - ERROR_PPCS_TIME_OUT
  - ERROR_PPCS_INVALID_ID
  - ERROR_PPCS_INVALID_PREFIX
  - ERROR_PPCS_ID_OUT_OF_DATE
  - ERROR_PPCS_MAX_SESSION
  - ERROR_PPCS_USER_LISTEN_BREAK
  - ERROR_PPCS_UDP_PORT_BIND_FAILED
  - ERROR_PPCS_INVALID_APILICENSE

# PPCS_LoginStatus_Check

- Function Declare:
  - INT32 PPCS_LoginStatus_Check(CHAR* bLoginStatus)
- Description:
  - PPCS_LoginStatus_Check:  To  Check login status of device
- Parameters:
  - **bLoginStatus** : To receive Login status
    - 0, Not login to Server
    - 1, Successfully login to Server (get server's login ack response in last 60 sec)
- Return:
  - ERROR_PPCS_SUCCESSFUL
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_INVALID_PARAMETER

# PPCS_Connect/PPCS_Connect_Break

- Function Declare:
  - INT32 PPCS_Connect(const CHAR *TargetID,CHAR bEnableLanSearch, UINT16 UDP_Port)
  - INT32 PPCS_Connect_Break()
  - INT32 PPCS_ConnectByServer(const CHAR *TargetID, CHAR bEnableLanSearch, UINT16 UDP_Port, CHAR *ServerString)
- Description:
  - PPCS_Connect: To look for target device and connect it.
  - PPCS_Connect_Break: to break PPCS_Connect.
  - PPCS_ConnectByServer: The same as PPCS_ConnectByServer, but user can specify with which server to perform this function.
- Parameters:
  - **TargetID** : The target device ID
  - **bEnableLanSearch:**
- refer to next page
  - **UDP_Port** : Specify the UDP port. if **UDP_Port** =0, a random port will be used.
  - **ServerString**: Encoded string, specifying the server address.
- Return:
  - >=0 , successful and the Session handle is returned.
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_TIME_OUT
  - ERROR_PPCS_INVALID_ID
  - ERROR_PPCS_INVALID_PREFIX
  - ERROR_PPCS_DEVICE_NOT_ONLINE
  - ERROR_PPCS_NO_RELAY_SERVER_AVAILABLE
  - ERROR_PPCS_MAX_SESSION
  - ERROR_PPCS_UDP_PORT_BIND_FAILED
  - ERROR_PPCS_USER_CONNECT_BREAK



# bEnableLanSearch

- if bEnableLanSearch = 0x7F --> Connect() is used to detect if Device is on-line.
  - Return Value:
    - ERROR_PPCS_SUCCESSFUL ---> Device of DID is on line
    - ERROR_PPCS_INVALID_PREFIX ---> Invalid Prefix of DID
    - ERROR_PPCS_INVALID_ID ---> Invalid DID
    - ERROR_PPCS_DEVICE_NOT_ONLINE ---> Device is not On-line (Not Login in last 5 minute)
    - ERROR_PPCS_TIME_OUT ---> No Response from Server
- else Connect() Connect is used to connect Device.
  - Bit 0 [LanSearch] , 0: Disable Lan search, 1: Enable Lan Search
  - Bit 1~4 [P2P Try time]:
    - 0 (0b0000): 5 second (default)
    - 1 (0b0001): 1 second
    - 2 (0b0010): 2 second
    - 3 (0b0011): 3 second
    - ....
    - 14 (0b1110): 14 second
    - 15 (0b1111): 0 second, No P2P trying
  - Bit 5 [RelayOff], 0: Relay mode is allowed, 1: No Relay connection
  - Bit 6 [ServerRelayOnly], 0: Device Relay is allowed, 1: Only Server relay (if Bit 5 = 1, this value is ignored)
- example:
  - bEnableLanSearch = 0 (0b00000000): LanSearch Off, P2P for 5 sec, device relay then server relay
  - bEnableLanSearch = 1 (0b00000001): LanSearch On , P2P for 5 sec, device relay then server relay
  - bEnableLanSearch = 7 (0b00000111): LanSearch On , P2P for 3 sec, device relay then server relay
  - bEnableLanSearch = 16(0b00010000): LanSearch Off, P2P for 8 sec, device relay then server relay
  - bEnableLanSearch = 30(0b00011110): LanSearch Off, No P2P , device relay then server relay
  - bEnableLanSearch = 31(0b00011111): LanSearch On , No P2P , device relay then server relay
  - bEnableLanSearch = 32(0b00100000): LanSearch Off, P2P for 5 sec, relay Off
  - bEnableLanSearch = 33(0b00100001): LanSearch On , P2P for 5 sec, relay Off
  - bEnableLanSearch = 37(0b00100101): LanSearch On , P2P for 2 sec, relay Off
  - bEnableLanSearch = 64(0b01000000): LanSearch Off, P2P for 5 sec, server relay only
  - bEnableLanSearch = 65(0b01000001): LanSearch On , P2P for 5 sec, server relay only
  - bEnableLanSearch =127(0b01111111): Connect() is used to detect if Device is on-line. (Note define of Return value is different)

# PPCS_Check

- Function Declare:
  - INT32 PPCS_Check(INT32 SessionHandle, struct ST_Session *SessionInfo)
- Description:
  - PPCS_Check : To check session information.
- Parameters:
  - **SessionHandle** : The session handle
  - **SessionInfo**: the structure where session iformation is retrived.
- Return:
  - ERROR_PPCS_SUCCESSFUL;
  - ERROR_PPCS_NOT_INITIALIZED;
  - ERROR_PPCS_INVALID_PARAMETER;
  - ERROR_PPCS_INVALID_SESSION_HANDLE;
  - ERROR_PPCS_INVALID_SESSION_HANDLE;
  - ERROR_PPCS_SESSION_CLOSED_CALLED;
  - ERROR_PPCS_SESSION_CLOSED_TIMEOUT;
  - ERROR_PPCS_SESSION_CLOSED_REMOTE;

## PPCS_Close / PPCS_ForceClose

- Function Declare:
  - INT32 PPCS_Close(INT32 SessionHandle)
  - INT32 PPCS_ForceClose(INT32 SessionHandle)
- Description:
  - PPCS_Close : To release resource used by specified SessionHandle.
  - PPCS_ForceClose : To release resource used by specified SessionHandle. Don’t care if remote site received data written.
- Parameters:
  - **SessionHandle** : The session handle
- Return:
  - ERROR_PPCS_SUCCESSFUL
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_INVALIED_SESSION_HANDLE

# struct st_PPCS_NetInfo

- CHAR bFlagInternet; // Internet Reachable? 1: YES, 0: NO
- CHAR bFlagHostResolved; // P2P Server IP resolved? 1: YES, 0: NO
- CHAR bFlagServerHello; // P2P Server Hello? 1: YES, 0: NO
- CHAR NAT_Type; // NAT type,

  0: Unknow, 1: IP-Restricted Cone type, 2: Port-Restricted Cone type, 3: Symmetric
- CHAR MyLanIP[16]; // My LAN IP.
  - If (bFlagInternet==0) || (bFlagHostResolved==0) || (bFlagServerHello==0), MyLanIP will be "0.0.0.0“
- CHAR MyWanIP[16]; // My Wan IP.
  - If (bFlagInternet==0) || (bFlagHostResolved==0) || (bFlagServerHello==0), MyWanIP will be "0.0.0.0”

## struct st_PPCS_Session

- INT32  Skt;                                        // Sockfd
- struct sockaddr_in RemoteAddr;   // Remote IP:Port
- struct sockaddr_in MyLocalAddr;  // My Local IP:Port
- struct sockaddr_in MyWanAddr;  // My Wan IP:Port
- UINT32 ConnectTime;  // Connection build in ? Sec Before
- CHAR DID[24];                // Device ID
- CHAR bCorD;       // I am Client or Device, 0: Client, 1: Device
- CHAR bMode;      // Connection Mode: 0: P2P, 1:Relay Mode

# PPCS_Read

- Function Declare:
  - INT32 PPCS_Read(INT32 SessionHandle, UCHAR Channel, CHAR *DataBuf, INT32 *DataSize, UINT32 TimeOut_ms)
- Description:
  - PPCS_Read: To Read data from specified **Channel** of specified **SessionHandle**. Execution of PPCS_Read will block untill **DataSizeToRead** bytes are read, or TimeOut_ms expired.
- Parameters:
  - **SessionHandle** : The session handle
  - **Channel**: The Channel ID, 7.
  - **DataBuf**: The data buffer
  - **DataSize**: Speciy how many byte to read. And, after return, it carry number of byte read.
  - **TimeOut_ms**: Time out value, in mini second.
- Return:
  - ERROR_PPCS_SUCCESSFUL
  - ERROR_PPCS_TIME_OUT
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_INVALID_SESSION_HANDLE
  - ERROR_PPCS_SESSION_CLOSED_REMOTE
  - ERROR_PPCS_SESSION_CLOSED_TIMEOUT

## PPCS_Write

- Function Declare:
  - INT32 PPCS_Write(INT32 SessionHandle, UCHAR Channel, CHAR *DataBuf, INT32 DataSizeToWrite)
- Description:
  - PPCS_Write: To write data into specified **Channel** of specified **SessionHandle**. Execution is no-blocked. (Important: Don’t write any more data, if **WriteSize** from PPCS_Check_Buffer() is larger then 2MB, otherwise it will cause malfunction.)
- Parameters:
  - **SessionHandle** : The session handle
  - **Channel**: The Channel ID, 0~7.
  - **DataBuf**: The data buffer
  - **DataSizeToWrite** : Speciy how many byte to writeto remote site
- Return:
  - >= 0, Number of byte writen
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_INVALID_PARAMETER
  - ERROR_PPCS_INVALID_SESSION_HANDLE
  - ERROR_PPCS_SESSION_CLOSED_REMOTE
  - ERROR_PPCS_SESSION_CLOSED_TIMEOUT
  - ERROR_PPCS_REMOTE_SITE_BUFFER_FULL

# PPCS_Check_Buffer

- Function Declare:
  - INT32 PPCS_Check_Buffer(INT32 SessionHandle, UCHAR Channel, UINT32 *WriteSize, UINT32 *ReadSize)
- Description:
  - PPCS_Check_Buffer: To Chek current write buffer and read buffer size. Write buffer are data to send to remote, read buffer are data received from remote site.
- Parameters:
  - **SessionHandle** : The session handle
  - **Channel**: The Channel ID, 7.
  - **WriteSize**: The write buffer size, in byte
  - **ReadSize**: The read buffer size, in byte
- Return:
  - ERROR_PPCS_SUCCESSFUL
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_INVALIED_SESSION_HANDLE
  - ERROR_PPCS_SESSION_CLOSED_REMOTE
  - ERROR_PPCS_SESSION_CLOSED_TIMEOUT

# PPCS_PktSend

(For Ver 2.0.0 later ONLY!)

- Function Declare:
  - INT32 PPCS_PktSend(INT32 SessionHandle, UCHAR Channel, CHAR *PktBuf, INT32 PktSize)
- Description:
  - PPCS_PktSend: To send a data packet to specified **Channel** of specified **SessionHandle**. Execution of PPCS_PktSend is no-blocked. (Important: PPCS_PktSend is not reliable, that means remote site MAY NOT receive it, even PPCS_PktSend return >=0).
- Parameters:
  - **SessionHandle** : The session handle
  - **Channel**: The Channel ID, 0~7.
  - **PktBuf**: The data buffer
  - **PktSize** : Speciy how many byte to send to remote site, max: 1240 Byte
- Return:
  - >= 0, Number of byte writen
  - ERROR_PPCS_INVALID_PARAMETER
  - ERROR_PPCS_INVALID_SESSION_HANDLE
  - ERROR_PPCS_SESSION_CLOSED_REMOTE
  - ERROR_PPCS_SESSION_CLOSED_TIMEOUT

# PPCS_PktRecv

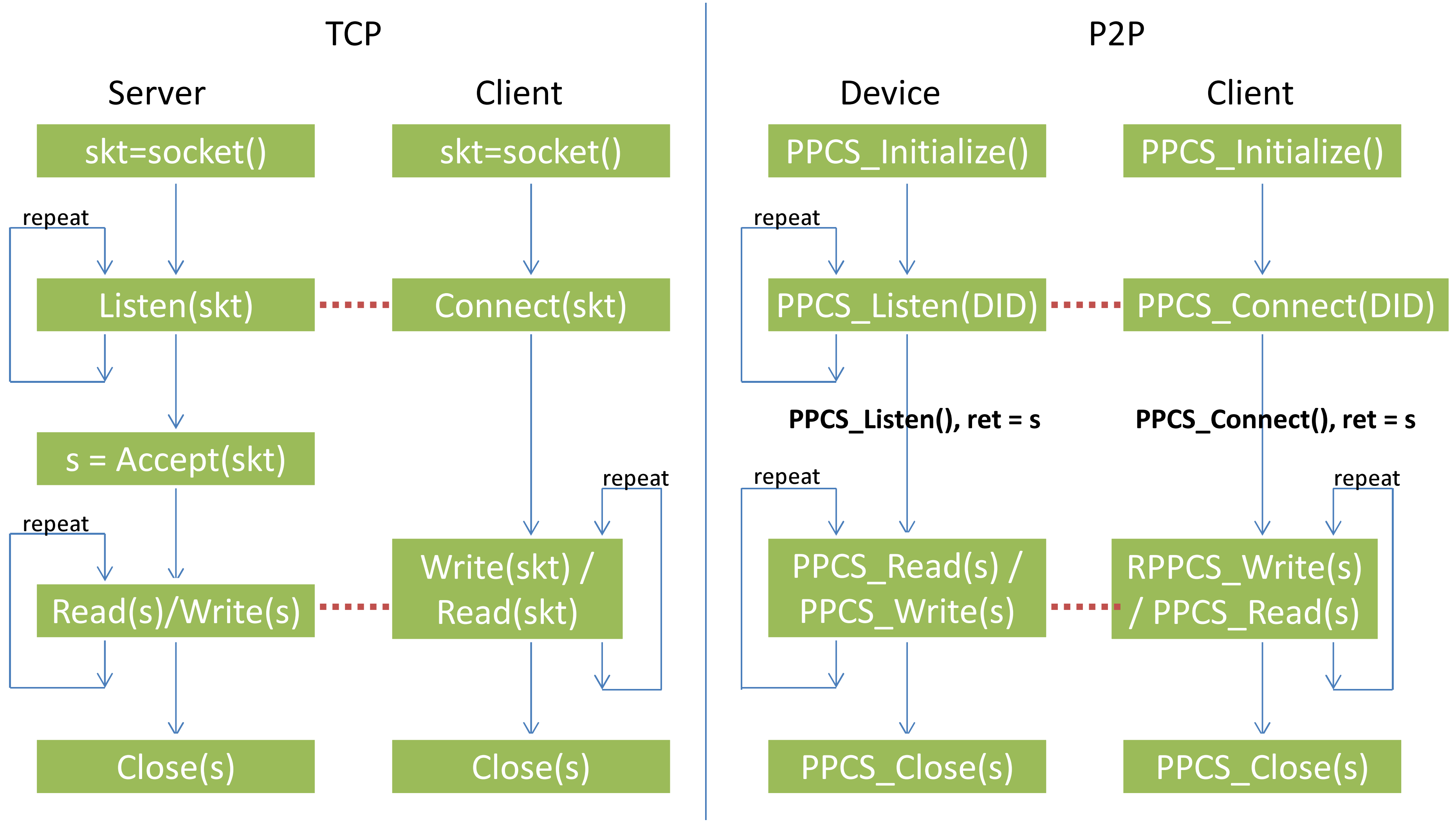
(For Ver 2.0.0 later ONLY!)

- Function Declare:
  - INT32 PPCS_PktRecv(INT32 SessionHandle, UCHAR Channel, CHAR *PktBuf, INT32 *PktSize, UINT32 TimeOut_ms)
- Description:
  - PPCS_PktRecv: To receive a data packet of specified **Channel** of specified **SessionHandle**. Execution of PPCS_PktRecv will block untill a data packet arrived, or TimeOut_ms expired. (Important: after return of PPCS_PktRecv, user **MUST** call another PPCS_PktRecv **As Soon As Possible** to prevent lose of data packet).
- Parameters:
  - **SessionHandle** : The session handle
  - **Channel**: The Channel ID, 7.
  - **PktBuf**: The data buffer
  - **PktSize**: When calling, **PktSize** speciy the size of PktBuf. And, after return, it carry number of byte received.
    (Warning, if **PktSize** is small then received packet size, the return value will be ERROR_PPCS_SUCCESSFUL. However, the final extra bytes in received packet will be truncated.)
  - **TimeOut_ms**: Time out value, in mini second.
- Return:
  - ERROR_PPCS_SUCCESSFUL
  - ERROR_PPCS_TIME_OUT
  - ERROR_PPCS_NOT_INITIALIZED
  - ERROR_PPCS_INVALID_SESSION_HANDLE
  - ERROR_PPCS_SESSION_CLOSED_REMOTE
  - ERROR_PPCS_SESSION_CLOSED_TIMEOUT
  - ERROR_PPCS_SESSION_CLOSED_TIMEOUT

## Defference Between PPCS_PktSend and PPCS_Write

| | PPCS_Write | PPCS_PktSend |
|---|---|---|
| Receiving API | PPCS_Read<br>(PPCS_Read can not read Data packet from PPCS_PktSend) | PPCS_PktRecv<br>(PPCS_PktRecv can not receive data from PPCS_Write) |
| Buffering | Written data is stored in under-layer buffer. User may call PPCS_Check_Buffer to check buffer size used. | No Buffering.<br>PktData is sent to remote size immediately. |
| Reliability | Writen data will be sent to remote site reliably. | PktData may be lost during transmission on Network. |
| TCP or UDP style | TCP-Like.<br>User may call 1 PPCS_Read to read data writen by serveral times of PPCS_Write call, or call PPCS_Read serveral times to read data by 1 PPCS_Write. | UDP-Like.<br>Every PPCS_PktRecv receives data packet from exactly single PPCS_PktSend. |
| Data Size | PPCS_Write can write more than 1240 Byte (Up to 2MB, if current write buffer is 0) in one call. | PPCS_PktSend can only send at most 1240 Byte in one call. |

# PPCS Read / Write API flows


TCP
Server
Client
skt=socket()
skt=socket()
repeat
Listen(skt)
Connect(skt)
s = Accept(skt)
repeat
repeat
Read(s)/Write(s)
Write(skt) / Read(skt)
Close(s)
Close(s)
P2P
Device
Client
PPCS_Initialize()
PPCS_Initialize()
repeat
PPCS_Listen(DID)
PPCS_Connect(DID)
PPCS_Listen(), ret = s
PPCS_Connect(), ret = s
repeat
repeat
PPCS_Read(s) / PPCS_Write(s)
RPPCS_Write(s) / PPCS_Read(s)
PPCS_Close(s)
PPCS_Close(s)