WINCI Version 1.1, a Windows Packet-Driver for Common-ISDN-API 2.0

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WINCI is Shareware

WINCI, as it is provided, is a demo version. To make use of the full capabilities of WINCI you have to register WINCI. The basic registration fee for a single user license of WINCI is DM 70,-. Please read the file "WINCI.REG" for details.

As long as you have NOT registered WINCI you may test WINCI using a ? in place of the registration code. In this case WINCI will stop forwarding data 20 min after startup.

Disclaimer

The program and this documentation is

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Overview

WINCI (= WINdows Common Isdn packet-driver) is an ethernet-type (class=1) packet-driver for IP-Routing or remote Ethernet bridging over ISDN. WINCI communicates with the ISDN card using the Common-ISDN-API 2.0 specification (an international standard for accessing ISDN cards). Because of this, WINCI is completely hardware independent.

WINCI was developed for use with Trumpet Winsock, to provide a simple and easy way for Internet access over ISDN.

WINCI supports a large set of protocols for communication with other vendors ISDN routers or servers. Among these protocols are: LAPB, Frame-Relay, PPP, SLIP, Cisco-HDLC.

WINCI can communicate at least with the following commercial systems:
Ascend Routers, AVM MPR 3.0, Biodata ISDN Router, Cisco Routers, Conet S2M Router, INS/CLS Banzai ISDN Router, netCS ISDN Router, RzK SLIP Bridge, SGI Indy ISDN 1.0,

Spyder Routers, SunLink ISDN 1.0, SunLink ISDN 1.0.2.

WINCI is a Windows program for use with CAPI 2.0 DLL implementations. WINCI was written for use with ISDN BRI PC cards.

The current version of WINCI supports two independent active connections at a time. Alternativly a connection can use both B-channels for loadsharing. WINCI can be loaded more than once, if more than two simultaneous connections to different sites are desired. Loadsharing can be configured as static or dynamic (bandwidth on demand). Dynamic loadsharing can be used concurrently with a second independent connection.

Loadsharing over two channels is implemented using simple round robin scheduling, because TCP/IP doesn't require the original packet sequence. This is completely hardware independent and supported by many router systems.

Availability

The latest version of WINCI is available on ftp.biochem.mpg.de in directory /pc/isdn.

Installation

To use WINCI you have to set up a configuration file with your ISDN configuration as described below. The default name for this file is WINCI.INI.

To load the Packet Driver into memory run WINCI.EXE after starting your CAPI-2.0 DLL Software and before starting your Internet software (e.g. TCPman).

WINCI.EXE requires the following arguments:
(Parameters in [ ] are optional, if not given a default is used)

WINCI RegCode PacketInterrupt [ConfigFile]

"**RegCode**" is your personal registration code you will receive after registration of WINCI. As long as you have NOT registered WINCI you may test WINCI using a ? in place of the registration code. In this case WINCI will stop forwarding data 20 min after startup.

"**PacketInterrupt**" defines the software interrupt for the Packet Driver application. The value has to be in the range from 0x60 to 0x80.

"**ConfigFile**" specifies the name of the WINCI configuration file. If the name is not given, it defaults to "WINCI.INI". The configuration file is a readable text file. Read the section "Setting up an WINCI configuration file" below for creating up an WINCI configuration file.

Setting up a WINCI configuration file

Structure of the configuration file

The configuration file consists of the following formal parts:

[global options]
[translation entry for incoming calls from numbers not specified]
[translation entries for incoming and outgoing calls]

The first section is optional, but there has to be at least one of the two types of translation entries.

The global options control WINCI's overall behaviour. Global options can be specified on one or more lines. Examples for global option:

        -e895123456   # local number for outgoing calls
        -c2   # controller 2
        -u   # only one active channel
        -w   # active display on DOS screen

See the "Global options" section below for a complete reference.

Attention:
     To enable outgoing calls a local (calling) number has to be defined with the -e option.

The second and third part consist of translation entries to map IP-addresses to ISDN numbers and to select peer specific parameters for these entries.

The translation entries in the configuration file have two functionalities:

-     they act as a translation table for IP routing on outgoing calls by mapping the IP-address of the peer to an ISDN number. They **don't** operate as a routing table.

- they are used for calling line identification (CLI) on incoming calls.

Incoming connections will be accepted only from ISDN numbers specified in the configuration file. To disable CLI and allow incoming calls from any number, the first translation entry has to contain a '*' in the common part of ISDN number field. For incoming calls from ISDN numbers not otherwise specified, the parameters of this entry will be used.

The translation entries in the file have to be in the following format:

ip-address ISDNnumber [ISDNnumber2] [options] [# comment]

"**ip-address**" defines the IP-address of the peer.
"**ISDNnumber**" defines the ISDN number of the peer.
"**ISDNnumber2**" defines a second ISDN number, when used with loadsharing.
"**options**" define the protocol, time-out, ... for this link.

If the same IP-address appears more than once in the configuration file, WINCI will try all corresponding ISDN numbers until a connection an be established.

Attention: If the first entry in the configuration file selects an ethernet bridging protocol, the use of the configuration file as a translation table for outgoing calls is disabled. All outgoing calls will be set up to the first entry. Further entries will be used only for CLI of incoming calls. WINCI can operate only in routing or bridging mode. You can **not** mix entries with routing and bridging protocols in the configuration file.

WINCI supports IP-address based routing as well as interface based routing of IP packets.

For IP-applications not supporting IP-address based routing or in case of simple point-to-point configurations, a single translation entry for outgoing calls may be specified with an IP-address of 0.0.0.0. In this case no further translation entries for outgoing calls are allowed and all IP packets (unicast and broadcast) sent from the application are forwarded to the ISDN peer.

For translation entries having a non zero IP-address only unicast IP packets routed via this IP-gateway are forwarded to the corresponding ISDN peer. In this case the IP-address has to match the (or one of the) IP-gateway address(es) in your IP-configuration of your application software.

Up to 64 translation entries can be specified in the configuration file. Loadsharing entries to two different ISDN numbers allocate two entries.

Global options:

ip-address
> defines a static local IP-address for use with PPP negotiation. You can not combine the IP-address with other global options on the same line.

-a
> disables the auto-dialler. If not selected WINCI will dial-on-demand.
> default: auto-dialler enabled

-c n[,56]
> selects the ISDN controller (card), n specifies the controller number in the range 1..N.. Specify 56 for 56kBit ISDN lines.
> default: 1, 64kBit

-i vector
> specifies the software interrupt for communication with the Common-ISDN-API-2.0

software.
default: 0xf1

e OutgoingNumber[,ListenNumber]
the "OutgoingNumber" is used as the calling number for outgoing calls. The number may be screened by the network.
the "ListenNumber" specifies the number WINCI will listen on incoming calls. If this number isn't defined WINCI will listen for any call.

-k setup[,sleep[,callbackwait]]
specifies the set-up time in seconds. WINCI will wait "setup" seconds for a connection to come up. If the connection does not reach the active state during this time, WINCI resets the channel. The "sleep" parameter allows you to modify the delay between a disconnect and the next dial request. The "callbacklwait" parameter allows you to specify the delay before WINCI will call-back.
defaults: 10,5,2 seconds

-r log-ip,my-ip[,interval][c]
remote logging on a UNIX host with a syslogd. Using WINCI with IP-Router software this option can be used to log all connection related messages on a UNIX host with a Berkeley syslogd.
"log-ip" defines the IP address of the UNIX host.
"my-ip" defines the source IP address of syslog messages sent by WINCI (a packet driver can not automatically retrieve this information from the router).
If "interval" is specified and a connection is up, a syslog message will be sent every "interval"-seconds. "interval" should be a multiple of 8, otherwise it is internally rounded up to the next multiple of 8.
Appending a "c" to interval will send a syslog message for every charge message received from the CAPI software.
If the ip-addresses are set to 0.0.0.0 messages are sent to the screen.
Syslog-messages are sent with the characteristics "local0.info".

-u
Limits WINCI to one active connection at a time. This will reduce WINCI's memory requirement by 20kB. Selecting loadsharing (-m) overrides this option.

-j low[,high]
defines an ethernet type range for ethernet bridging. Ethernet packets with type values outside the selected range are discarded.   This filter applies to all bridging protocols.
"low" defines the lower boundary. default: 0
"high" defines the upper boundary. default: 0xffff

Translation entry format

IP-Address

IP addresses should be specified in standard dot format. e.g.: 141.61.1.23

ISDN number and related features of WINCI

PBX's sometimes require a special key-code for dialling out. If this prefix is not displayed on incoming calls, Dial back and CLI will normally fail. To solve this problem WINCI supports an outgoing call prefix, which is not checked on incoming calls. The prefix can be specified in front of each ISDN number separated by a comma.

Digits, which should not be used in an outgoing call, but have to be present for CLI can be marked by a decimal point from the common part of the number.

Examples:

089.345678 will dial 345678 and will match incoming calls from 089345678.

0,30.123456 will dial 0123456 and will match incoming calls from 30123456.

00,123456789 will dial 00123456789 and will match incoming calls from 123456789.

Subaddresses can be appended to a number by separating them with a /. Only digits are supported in a subaddress.

The total length of number + subaddress is limited to 26 characters.

A SPV connection (available only in German ISDN, 1TR6) is set up by appending an "s" to the end of the ISDN-number. An incoming SPV request is accepted only if the "s" is specified.

The CAPI standard doesn't define a standard set-up for PVC's. Teles, Berlin supports PVC's (Digitale Festverbindungen D64s) using a pseudo ISDN number "tap" and selecting one of the B-channels. WINCI supports this feature of the Teles CAPI implementation and allows the selection of a PVC with the specification "1tap" or "2tap", depending on the desired channel, for the ISDN number.

Translation entry options:

WINCI supported protocols:
   (only one protocol can be used for one peer)

-f dlci[i]
   Frame-relay protocol. "dlci" specifies the data link connection identifier. Appending an "i" to the dlci switches encapsulation from "early" style to IETF format as described in RFC 1294 (but without fragmentation support, a data size of 1500 is assumed).

-p
   Point-to-Point protocol using default PPP-parameters. Of the possible upper layer protocols, only IP is supported at this time.
   From the PPP configuration options PPP PAP is supported in both directions. With the -n option an id/password combination can be specified for each remote site. With the -g option a local id/password can be defined for each peer.
   WINCI accepts the following PPP options from the remote site:
   -   LCP MRU requests with values greater or equal to 1500.
   -    LCP protocol field compression
   -    LCP address and control field compression.
   -   IPCP IP-ADDRESS requests. The received ip-address can be retrieved
        from an IP application program via RARP.

        Additional options for use with PPP. These options have to be specified after the protocol selection option.

   -n id,password
      Userid/password combination for the remote PPP site. The authentication string is send only, if the remote site requests Password authentication during PPP option negotiation.

   -g id,password
      Defines a local userd/password combination. Incoming PPP connections are accepted only if the remote site sends this userid/password combination.

-h type
   other HDLC based protocols
   type = 0 IP-Data, no header
   type = 1 IP-Data, X.75 unnumbered information frame (UI) header
   type = 2 Cisco style HDLC header

type = 3 Ethernet bridging

-l type
              LAPB (X.75) based protocols (caller=DCE, window=7, mod 8)
    type = 0   IP-Data, no header,
    type = 1   multi-X.75 (called LAPB encapsulation on ACC-Routers or
                    multi-LAPB encapsulation on Cisco routers)
    type = 2[,login]   Asynchronous PPP (with Byte-Stuffing)
    type = 3   Ethernet bridging
    type = 5[,login]   SLIP
    type = 6[,login]   Ethernet bridging using SLIP encapsulation (SLX)

    For the "login" parameter see below (-y Option).

-b baudrate[,login]
    asynchronous point-to-point-protocol (PPP) with V.110 bit-stuffing. "baudrate" defines
    the desired transfer rate.
    baudrate = 9, 9600 baud, async, 8 bit, no parity, 1 stop bit
    baudrate = 19, 19200 baud, async, 8 bit, no parity, 1 stop bit
    baudrate = 38, 38400 baud, async, 8 bit, no parity, 1 stop bit

    For the "login" parameter see below (-y Option).

-s baudrate[,login]
    SLIP protocol with V.110 bit-stuffing. "baudrate" defines the desired transfer rate.
    baudrate = 9, 9600 baud, async, 8 bit, no parity, 1 stop bit
    baudrate = 19, 19200 baud, async, 8 bit, no parity, 1 stop bit
    baudrate = 38, 38400 baud, async, 8 bit, no parity, 1 stop bit

    For the "login" parameter see below (-y Option).

-y baudrate[,login]
    SLX (Ethernet bridging using SLIP encapsulation) protocol with V.110 bitrate adjustment.
    "baudrate" defines the desired transfer rate.
    baudrate = 9, 9600 baud, async, 8 bit, no parity, 1 stop bit
    baudrate = 19, 19200 baud, async, 8 bit, no parity, 1 stop bit
    baudrate = 38, 38400 baud, async, 8 bit, no parity, 1 stop bit

    login = expect1/send1,expect2/send2,...
    A sequence of strings to send for asyncPPP or SLIP/SLX login. To adapt to the different
    kinds of login sequences used by asyncPPP/SLIP servers, WINCI uses an expect/send
    sequence. Each "send" string will be automatically terminated by a RETURN. This way
    an empty string field will send a single RETURN. Special characters can be included in
    the strings by escaping with "\" and specifying the ASCII code of the character (e.g. \32
    will insert a space). If required, the ascii code may be terminated by a ".". Additionally
    "\," will insert a comma and "\/" will insert a slash, otherwise used for separating strings.
    A "\." will insert a literal "." after an ASCII code and "\\" will insert a single "\". WINCI
    shows all characters received and will switch to SLIP mode after sending the last string.
    The total length of the string sequence is limited to 64 characters.

   default protocol: -h0

Other translation entry options:

   The following options can be specified for each ISDN number entry in the configuration file:

-t max-idle[,min-idle[s]]
    an idle connection will be disconnected after "max-idle"-seconds. Setting "max-idle" to

zero disables shutdown of idle connections. Specifying a "min-idle" value lower than "max-idle", an outgoing (charged) connection will be hold at least "min-idle" seconds, it will be closed down shortly before the next charge unit is exceeded or max-idle expires. The time of one charge unit is calculated from the first two units received. max-idle may be used to specify the length of the first charge-unit.

To use adaptive timeout without advice-of-charge an "s" can be appended to the min-idle value. In this case advice-of-charge messages are simulated by WINCI. The max-idle value specifies the length of a charge unit.

default: max-idle: 300 seconds, min-idle: disabled

-m high[,low]
static or dynamic loadsharing over both s0-channels.
"high" = 0, static loadsharing, the caller will always try to activate both channels.
"high" <> 0, dynamic loadsharing, if the load is higher than 6000 Bytes/sec for "high"-seconds, the system will activate the second channel. After "down"-seconds of a load lower than 6000 Bytes/sec the second channel will be closed down. If "down" is not specified, the "max-idle" Time-out will be used (see option -t).
A -m option has to be specified at both ends of a link. However, only the caller of the first channel will activate the second channel.
The values for "high" and "low" should be multiples of 8, otherwise they will be rounded up to next multiple of 8.

To set up loadsharing to different target ISDN numbers, a second ISDN number can be specified for each translation entry.

-d flags

Specifies WINCI's mode of operation and various flags:
The "flags" parameter is interpreted as a 16 Bit value with the following meaning:

Bit 0-2: Operation mode:
mode = 0, outgoing calls are disabled.
mode = 1, incoming and outgoing calls are allowed.
mode = 2, an outgoing call is dropped after sending the connect request and the system waits for a call back.
mode = 3, incoming calls are rejected but trigger an outgoing call to the received ISDN number.
mode = 4, incoming calls are disabled.

Bit 3-7: unused
Bit 8:   Don't reset disconnect timer on received packets.
Bit 9:   Don't reset disconnect timer on sending broadcast packets. Don't open a connection by broadcast packets.
Bit 10:   Send broadcast packets over this link.
Bit 11:   Operate as an IP-address provider for PPP. (If this is a PPP link and the IP-address of this entry isn't zero, tell the peer which IP-address he has to use.)

default: 1, incoming and outgoing calls enabled

Additional features

1. Dynamic IP address assignment:
   WINCI supports dynamic IP address assignment by a remote system via RARP and the PPP IPCP IP-ADDRESS negotiation:

   - (Make sure that your peer supports the PPP IPCP IP-ADDRESS option.)
   - Configure your IP software for use with RARP.

- Use WINCICTL -d PktInt [ip-address] to manually set up a connection.
- (Check the received IP address with WINCICTL -i PktInt.)
- Start your IP software.

2. Ascend Routers use the PPP IPCP IP-ADDRESS negotiation for remote system identification. They don't support asking for an IP-address using PPP IPCP IP-ADDRESS negotiation(as described above). For Ascend Routers WINCI has to provide the correct IP-address to the peer. To accomplish this you can set the local IP-address as a global option in the configuration file. You can modify the ip-address to any desired value using **WINCICTL-i <pkt-int> <ip-address>**

3. WINCI can operate as an IP address provider for PPP connections. This feature can be enabled on a peer basis using a flag of the -d option.

Controlling and Monitoring

1. WINCI displays the state of an ISDN connection on its status page and on the icon:

        _ = free,
        D = D-channel up,
        C = B-channel requested,
        B = B-channel up,
        A = connection set up,
        additional information for PPP:
        L = LCP configuration up,
        I = PAP configuration up, IPCP configuration started,
        P = PPP connection up

Deinstallation

Unloading WINCI with an active Packet Driver application may cause a PC to crash. Close the Packet Driver application (e.g. Trumpet Winsock) before closing WINCI.

Ethernet characteristics

WINCI works as an ethernet type Packet Driver. The ethernet address of WINCI is defined as: 00-00-0xFB-0xAA-00-<pkt-int>. (Thanks to RzK, Asbach, Germany for using numbers from their official 00-00-0xFB range.) "pkt-int" is replaced by the software interrupt number in the range 0x60 to 0x80 used for accessing WINCI.

Changing the ethernet address may be required when connecting two WINCI's with direct applications using an ethernet bridging protocol.

Examples

1. a simple point-to-point configuration to connect a standalone PC to an IP provider. Local IP address 141.61.224.5. The IP Provider has a nameserver with address 141.61.1.32. The connections uses PPP protocol and the PC has to identify itself using the id "guest" and password "gast". Because the IP address in the WINCI configuration file is specified as 0.0.0.0 ALL packets will be send to the peer 0815712345. This way NO gateway IP address is required in the IP configuration.

   WINCI ? 0x60

   WINCI.INI:
   ```
   -e12345678      #local number
   -u              # only only one active channel
   -w              # activity display
   0.0.0.0 089987654 -p -nguest,gast -t60      # timeout 60 sec
   ```

   And the IP configuration for the PC:
   ```
   my_ip=141.61.224.5
   netmask=255.255.255.0           # netmask
   nameserver=141.61.1.32          # nameserver
   nameserver=141.61.1.23          # alternate nameserver
   domainslist="biochem.mpg.de"
   ```

2. WINCI in point-to-point configuration with dynamic Loadsharing. The second link will be established after 10 seconds of a load higher than 6000 Bytes/sec and will be closed after 20 seconds of a load lower than 6000 Bytes/sec.

   WINCI ? 0x60

   WINCI.INI:
   ```
   -e12345678                  # local number
   -w
   0.0.0.0 0815712345 -h2 -m10,20 -t90
   ```

3. a point-to-point configuration to connect a standalone PC to an IP provider using async PPP protocol with transparent login. For login WINCI expects "ogin:", the id "guest" is sent, than WINCI expects "word:" and sends "mypass", WINCI expects "erver>" and sends "ppp". After this WINCI automatically switches to PPP protocol.

   WINCI ? 0x60

   WINCI.INI:
   ```
   -e12345678      # local number
   -u              # only one active channel
   -w              # activity display
   0.0.0.0 089987654 -l2,ogin:/guest,word:/mypass,erver>/ppp -t60
   ```

Restrictions in current version

1. Option parsing is far away from being perfect. It is possible to specify conflicting options. Don't specify more than one protocol option per line (translation entry).

Support

Please mail comments, questions, problems to **heha@biochem.mpg.de**. I can not guarantee any level of technical support, or for any length of time. In general, I will give priority to registered users.

Warranty

There is absolutely NO WARRANTY, expressed or implied with this software. If you choose to use this software, you assume all risk.

Appendix A: Error codes

The error codes from WINCI are the same as defined in the Common-ISDN-API 2.0 specification:

2001	incorrect controller
2002	incorrect PLCI
2003	incorrect NCCI
2004	incorrect type
3101	B-channel incorrectly coded
3102	Info-mask incorrectly coded
3103	Serviced EAZ-mask incorrectly coded
3104	Serviced SI mask incorrectly coded
3105	B-channel protocol, level 2 incorrect
3106	DLPD incorrect
3107	B-channel protocol, level 3 incorrect
3108	NCPD incorrect
3109	NCPI incorrect
310A	Flags incorrectly coded
3201	Controller error
3202	Conflict between registrations
3203	Function not supported
3204	PLCI not active
3205	NCCI not active
3206	B-channel protocol, level 2 not supported
3207	Changeover of B-channel protocol, level 2 in this state not possible
3208	B-channel protocol, level 3 not supported
3209	Changeover of B-channel protocol, level 3 in this state not possible
320A	Unsupported parameters in DLPD
320B	Unsupported parameters in NCPD
320C	Unsupported parameters in NCPI
320D	Data length not supported
3301	Error on setup of D-channel, level 1
3302	Error on setup of D-channel, level 2
3303	Error on setup of B-channel, level 1
3304	Error on setup of B-channel, level 2
3305	Abort D-channel, level 1
3306	Abort D-channel, level 2
3307	Abort D-channel, level 3
3308	Abort B-channel, level 1
3309	Abort B-channel, level 2
330A	Abort B-channel, level 3
330B	B-channel connection, level 2 re-established
330C	B-channel connection, level 3 re-established

34xx   Abort by network, low order 8 Bit contain the cause value, the MSB is used to signal an error, but is not set by all Common-ISDN-API implementations:

00	Normal termination (0 = local, 3400 = from the network) Normale Ausloesung (0 = lokal, 3400 = durch die Gegenstelle)
81	Invalid call reference value Ungueltiger call reference Wert
83	Bearer service not implemented Dienst ist nicht verfuegbar oder nicht beantragt
87	Unknown caller identity
88	Caller identity already suspended
8A	No B-channel available Kein B-Kanal auf lokaler Anschlussleitung verfuegbar
8F	Disconnect Verbindung wurde getrennt
90	Facility code unknown in this network Leistungsmerkmal nicht implementiert
91	Requested service rejected Angefordertes Dienstmerkmal wurde abgelehnt, weil eigener oder ferner Anschluss keine Berechtigung besitzt
A0	Outgoing calls barred Abgehende Rufe wegen eingerichteter Sperre nicht moeglich
A1	User access busy Gegenstelle besetzt
A2	Closed-user-group refused connection Verbindung nicht moeglich wegen negativen GBG-Vergleich
A3	Nonexistent closed-user-group Angegebene GBG (geschlossene Benutzergruppe) unbekannt
A5	SPV not enabled for this number Kommunikationsbeziehung als SPV nicht freigegeben
A9	Temporarily not available Voruebergehende Stoerung
B5	Destination not obtainable Verbindung nicht aufbaubar wegen falscher Zieladresse, Dienste oder Dienstmerkmale
B8	Rufnummer des gerufenen Teilnehmers hat sich geaendert number of called station has changed
B9	ferne DEE nicht betriebsbereit remote station not ready
BA	No user responding Ruf wurde von keiner Datenstation beantwortet

BB Called station busy
    Gerufene Datenstation besetzt

BD Incoming calls barred
   Gerufener Teilnehmer hat Sperre gegen ankommende Rufe oder angeforderter Dienst
   vom gerufenen Teilnehmer nicht beantragt

BE Call was rejected by called station
    Ruf wurde von gerufener Datenstation abgewiesen

D9 Network congestion
    Engpass im Netz, kein B-Kanal verfuegbar

DA Connection was terminated or rejected by called station
    Verbindung von ferner Datenstation ausgeloest oder abgelehnt

E0 Call id incomplete
    Anwahlelemente fehlen

F0 Local procedure error
   Im aktuellen Verbindundsstand keine Dienstmerkmalanforderung moeglich

F1 Disconneted due to an error at the remote station
    Ausloesung wegen Fehler bei der gerufenen Station

F2 Remote user suspended call
    Die Gegenstelle hat die Verbindung abgebrochen

FF Local reject of user-to-user info
    D-Kanal Userinfo nicht unterstuetzt