

**KCodes Confidential**

KCodes Products  
Software Licensing  
(USB over IP and Small Footprint  
SMB)  
And  
LAN WIFI IP USB Hub

**Overview**

2009 08 11 Tue

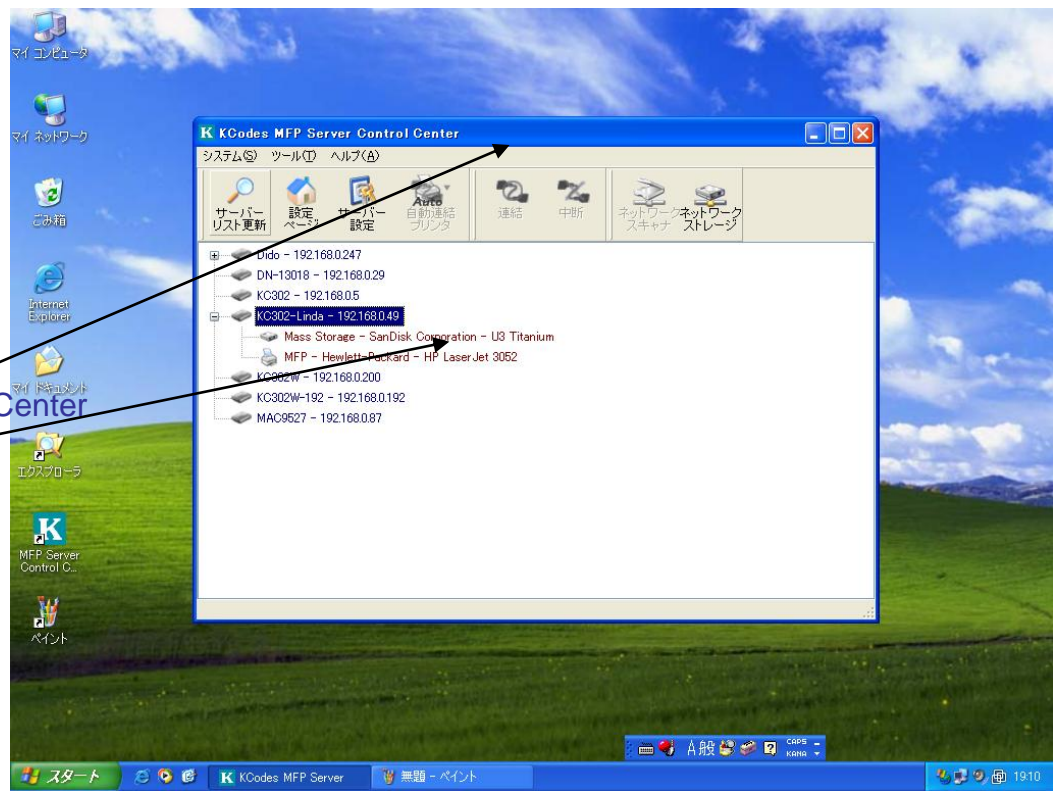
## Summary

- Successful licensing model to major network equipment brands on routers, NAS, etc. already massively deployed in the market
- Two software licenses:
  - USB over IP (footprint 75Kbytes): supports all USB devices
  - Small Footprint SMB (footprint 270Kbytes)+FAT R/W+NTFS R+CDFS+UDF: recommended for USB hard drives, flash memory, digital camera, CD/DVD
- Actively discussing with major notebook brands in Taiwan and Japan to bundle IP USB Hub with compact notebooks with few USB host ports, to increase USB device connectivity over LAN and WIFI
- Support of mobile devices (Windows CE/Mobile) in investigation
- Mobiles users no longer need to go through the hassles of connecting USB devices' cables
- Intelligence built-in to download media while mobile users are away
- For routers and NAS with print server support, greatly enhance compatibility with multifunction printer and reduce service calls.
- Proven Compatibility of USB Devices accumulated since 2005
- OS Compatibility
  - Windows XP, Vista, 2000, 2003, 32-bit and 64-bit
  - Mac OS 10.4 and 10.5, PowerPC and Intel

## Easy Integration of KCodes Software into Router and NAS

```
// Just one line of code
// When starting up, just load the kernel module
// usbSoftwareBus.ko uses Linux USB core, ohci, and ehci code in linux
insmod usbSoftwareBus.ko lanip="192.168.0.1" hostname="test" storageAccessMode=0
```

- KCodes provides 2 files for
  - One .ko file usbSoftwareBus.ko
    - Linux kernel module
    - Server-side discovery mechanism
  - One setup.exe file
    - Windows and MacOS driver/utility Control Center
    - Client-side discovery mechanism



## Benefit One

If your network products (router, NAS, etc) already support print server function, USB over IP will greatly help improve compatibility and reduce service calls

## Benefit Two

Consolidate Software Solutions to support  
USB devices in ODMs

## Benefit Three

A USB device becomes a networked and UPnP-like device.

Microsoft and Apple do not play in this field.

When a USB device is connected to the USB port of your network product (router, NAS, etc.), a pop-up menu shows up briefly on users' computers indicating this USB device is on the network now.

And a user can use this USB device as if it were physically connected to the user's computer.



Physical USB Connection



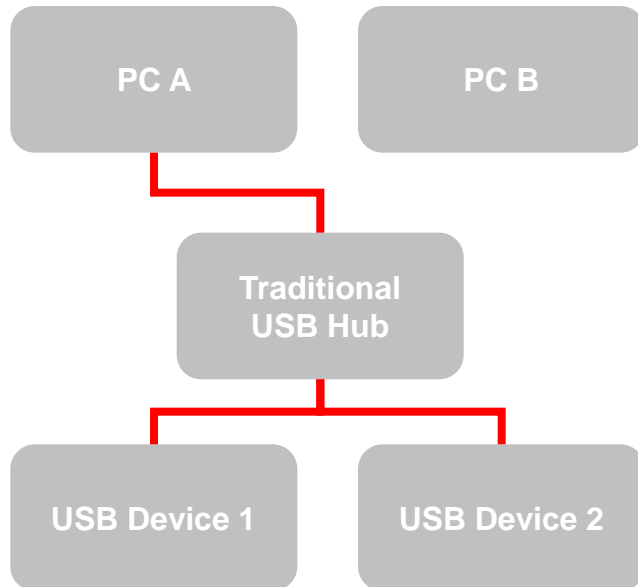
Virtual USB Connection

## Benefit Four

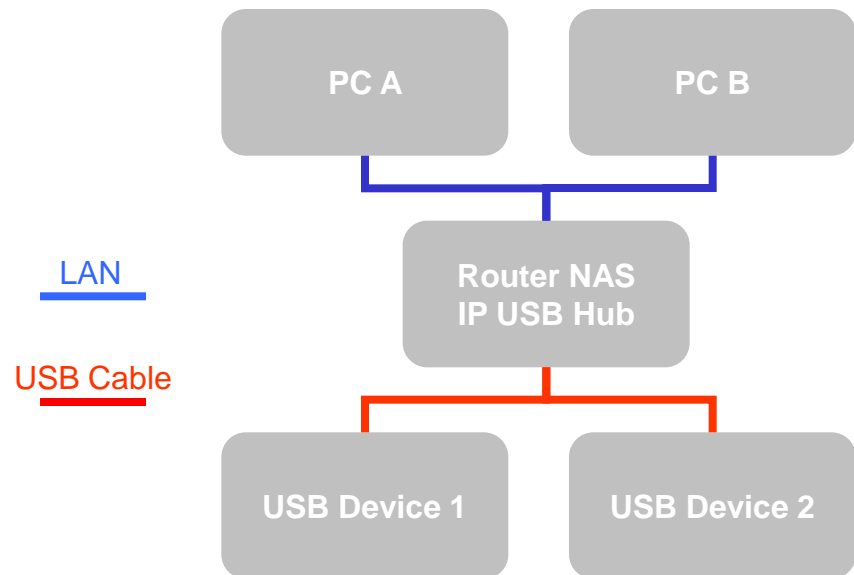
When the user goes home, the user no longer needs to find USB cables  
And Connect USB devices to the laptop every time!

A USB device is no longer tied to a PC. It can be used by any PC.

- USB Devices 1 and 2 cannot be shared
- PC B cannot use USB Device 1 nor 2



- USB Devices 1 and 2 can be shared
- PC A can use USB Device 1 and 2
- PC B can use USB Device 1 and 2



## One Subtlety of USB over IP

Software engineers writing USB device drivers may not follow exactly guidelines of programming Windows/MacOS drivers, and use non-standard “idioms”

Thus, the translation between USB commands and IP traffic becomes a big job, requiring many years of experiences to establish a database of non-standard “idioms”.

## Another Subtlety of USB over IP

A Windows/MacOS's USB command (a request and a response) may have timing constraints. If a request is not responded in time, Windows/MacOS may prompt error messages.

But IP traffic, especially in wireless environments, has inherent delays.

Programming USB over IP requires great expertise.

## Compatibility of USB over IP

USB over IP is essentially a translation between Windows/MacOS's USB commands and IP traffic.

The better the translation is, the better the compatibility is.

## Scope of the “Translation”

### Multifunction Print Server vs. IP USB Hub

There are four types of USB commands

- 1 Control Transfer
- 2 Interrupt Transfer
- 3 Bulk Transfer
- 4 Isochronous Transfer (for audio and video, with real time characteristics but permitting data loss)

Multifunction Print Server supports only multifunction printers, printers, scanners, and storage, which use only 1, 2, 3 above.

IP USB hub supports all USB devices, which use all 1-4 above, and includes the functions of Multifunction Print Server.

## Compatibility Improvements

In 2005 when we first rolled out our USB over IP products (multifunction print server), about 80% of new multifunction printer models were compatible.

Now, about 98% of new multifunction printer models are compatible, because the translation is getting much better.

From 2005 until now, we have not had any compatibility issue that we cannot resolve.

## When Using USB Storage

Hard Drive, Flash Memory, Digital Camera, CD/DVD ROM

Using USB over IP to access USB storage has two limitations:

1. The user needs to manually virtual-connect the USB storage to use it
2. Only one user can use the USB storage at a time

KCodes also licenses a small footprint smb/ftp server (entirely developed within KCodes) that removes these two limitations.

We call this the Server Mode, in contrast with the USB over IP Mode

# Switching between USB over IP Mode and Server Mode

When a USB storage is connected to a router, NAS, or IP USB hub, we can dynamically select using USB over IP mode or Server Mode to access this USB storage

## USB Device Support Chart

USB Device	Mode	
	USB over IP (Driver in PC)	Server (Driver in USB Device Server/IP USB Hub)
Printer	Yes.	Yes. Printer Class.
Scanner	Yes.	Yes. Scanner on HP Multifunction Printer Only.
Storage (HDD, Flash Drive, Card Reader)	Yes.	Yes. Storage Class.
Fax	Yes.	No.
Multifunction Printer	Yes.	No.
Digital Camera	Yes.	Yes. Still Image Capture Device Class (including PTP).
Webcam	Yes.	Yes. Still Image Capture Device Class.
iPod and iPhone	Yes. Can Use/Sync with iTunes.	Yes. Storage Class and iPod Read/Write.
UPS	Yes.	Yes. APC UPS.
Speaker Microphone Headset	Yes.	Yes. Audio Class and HID Class.
Internet Phone (Skype, SIP, VoIP)	Yes.	Yes. Audio Class and HID Class.
CD and DVD	Yes.	Yes. Storage Class.
Mouse Keyboard Keypad	Yes.	Yes. HID Class.
Bluetooth Adaptor	Yes.	No.
DTV Adaptor	Yes.	No.
WIFI Adaptor (11g, 11n)	Yes.	No.