IPCD

Reference Implementation

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## Prerequisites

In order to work with the IPCD reference implementation, you will need the following:

* Machine with at least 256 MB free memory  
  (can be Windows 7/Vista/XP, or Linux, or OSx)
* Java 7 Development Kit installed with JAVA\_HOME environment set correctly and the java executable in your PATH.

It is possible to run both the server and the device simulator on the same machine.

## Server Quick Start

The IPCD reference server is a standalone reference implementation of the server side of the protocol with a debug console that allows you to send commands from to connected devices.

To begin working with the reference server, download the distribution file and decompress it using the tar command:

tar –zxvf ipcd-server\_<date>.tar.gz

This will create the server base directory, called ipcd-server\_<date>

Inside of the base directory you will find a README file with more information about configuration options and commands supported by the server.

To run the server, change to the base directory and execute

./run\_server.sh (on Linux or OSx)

or

run\_server.bat (on Windows)

The server will start with the default configuration:

* IP Address: Any
* Port: 8080
* TLS: Off
* Mode: Accept only always-on (websocket) clients

Setting up TLS is covered in the README, but we recommend running without encryption during development to make protocol-level debugging easier.

A common configuration task is to change the port that the server binds to on startup (usually because you have something else running on port 8080). To do so, stop the server by pressing ctrl-c, then change to the config directory and edit the ipcd.properties file. Set the tcp.port property and save your change. The next time you start the server it will come up on the new port. If you have multiple network interfaces, you can force the server to bind to a specific IP address by setting the bind.address property.

Once the server is started, you can verify the IP address and port by opening a web browser and entering:

http://<bind.address>:<tcp.port>

You will be presented with a test page on the IPCD server.

The section below contains quick start instructions for the device simulator. After completing that section you will have a device connected to the server. The following section describes the server debug console which can be used to send commands to connected devices and inspect traffic between the device and the server.

## Device Simulator Quick Start

The IPCD Device Simulator is a reference implementation of the client or agent side of the protocol.

To begin working with the device simulator, download the distribution file and decompress it using the tar command:

tar –zxvf ipcd-dev-simulator\_<date>.tar.gz

This will create the simulator base directory, called ipcd-dev-simulator.

Inside of the base directory you will find a README file with more information about configuration options.

To run the device simulator, change to the base directory and execute

./run\_device.sh (on Linux or OSx)

or

run\_device.bat (on Windows)

The device simulator will start with the default configuration:

* Mode: Always-on (websocket)
* TLS: Off
* Server URL: ws://localhost:8080/ipcd/1.0
* Simulated Device: BlackBox-Multisensor2-00049B3C7A05

If you are running the server on a different machine or if you changed the server’s bind address or port setting, you will need to pass an appropriate server URL to the run\_device script:

./run\_device.sh ws://<bind.address>:<tcp.port>/ipcd/1.0

The simulator includes a profile for a single simulated (hypothetical) device; a MultiSensor2 with MAC address 00049B3C7A05, made by a vendor named BlackBox. The README file contains additional information on how to make your own simulated device profile.

## Using the Server Console

Once you have the device simulator connecting to the server, switch back to the server console. You will notice that every time the client sends a message to the server, it is logged in the console. When the Multisensor2 first connects, it sends two messages:

14:03:21.192 [pool-ipcds-worker-thread-1] INFO COMLOG - Device=>Server /127.0.0.1:1846=>/127.0.0.1:8080 : {"device":{"vendor":"BlackBox","model":"Multisensor2","sn":"00049B3C7A05","ipcdver":"0.2"},"events":["onBoot","onConnect"]}

14:03:22.123 [pool-ipcds-worker-thread-1] INFO COMLOG - Device=>Server /127.0.0.1:1846=>/127.0.0.1:8080 : {"device":{"vendor":"BlackBox","model":"Multisensor2","sn":"00049B3C7A05","ipcdver":"0.2"},"report":{"ms2.temperature":32.0,"ms2.luminosity":10270.0}}

Both show that message comes from the device to the server (Device=>Server), that the device is at localhost, ephemeral port 1846 and that the server is running on localhost port 8080. The first message is an event message showing that the device has booted and connected to the server. The second is a report on temperature and luminosity, which the Multisensor2 is configured to send periodically.

In addition to showing the messages sent between the device and the server, the console can also be used to send commands to a device. Console commands are documented in the online console help and in the README file for the server.

To see the supported console commands, type help in the console (console commands must be terminated with enter).

13:35:17.915 [main] INFO Console -

Usage: help [command]

Commands are [Device, GetParameterValues, SetParameterValues, GetParameterInfo, GetDeviceInfo, GetReportConfiguration, SetReportConfiguration, GetEventConfiguration, SetEventConfiguration, Download, Upload, Reboot, FactoryReset, Help].

For more information on a command, enter help [command].

Examples:

help

help SetParameterValues

Before using the console to send commands to a device, you first have to tell the server which device to target. Use the Device console command for this. To see information on the Device command, use help Device.

help Device

13:40:00.691 [main] INFO Console -

Usage: device <vendor> <model> <serialnum>

Device is a console-only command (not part of the IPCD protocol) that selects a device to interact with on the console. After specifying a device, all protocol commands entered into the console are sent to that device. An error will be returned if no device with the provided identity is currently connected

Examples:

Device BlackBox Multisensor2 00049B3C7A05

Enter the following on the console to select the connected simulator

Device BlackBox Multisensor2 00049B3C7A05

If the simulator is connected, the server will indicate success:

13:43:52.455 [main] INFO Console - device session [BlackBox-Multisensor2-00049B3C7A05]

Now that the simulator device is selected, you can enter commands such as the following, which retrieves all the parameter values from the selected device:

GetParameterValues

In response, the console will show the message sent from the server to the device:

13:45:22.324 [main] INFO COMLOG - Server=>Device Device [vendor=BlackBox, model=Multisensor2, sn=00049B3C7A05, ipcdver=0.2]@/127.0.0.1:1060=>/127.0.0.1:8002 :

{"parameters":[],"command":"GetParameterValues"}

The device simulator will respond:

13:45:22.344 [pool-ipcds-worker-thread-1] INFO COMLOG - Device=>Server /127.0.0.1:1060=>/127.0.0.1:8002 : {"device":{"vendor":"BlackBox","model":"Multisensor2","sn":"00049B3C7A05","ipcdver":"0.2"},"request":{"parameters":[],"command":"GetParameterValues"},"status":{"result":"success","messages":[]},"response":{"ms2.temperature":32.0,"ms2.luminosity":10270.0}}

All console commands with the exception of Device correspond to IPCD protocol commands which are described in the online help and in the IPCD protocol specification.