

# **Validation, Implementation and Conformance Testing of**

## **Bluetooth SDP**

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As a new short-range wireless communication technology, Bluetooth has been accepted widely for its powerful technical background and good market expectance. Service Discovery Protocol (SDP) is one of Bluetooth core protocols and provides a means of service discovery. In this thesis, I addressed the following aspects of protocol engineering:

### 1) Validation

I described the SDP protocol formally in SDL, then built a Random Simulation Structure for SDP protocol validation in *ObjectGEODE* simulation environment. The validation result shows that SDP matches the requirements defined in its service description; however some SDP PDU may be lost at the interface between SDP and its transport protocol. I further proposed a solution to overcome that problem.

### 2) Implementation in C language

After I performed the protocol validation, which contributes to reliability, conformity and interoperability of protocol implementation, I implemented the SDP protocol in ANSI C. I addressed the portability and efficiency issues from such aspects as architectural design, programming style, compilation environment.

### 3) Conformance Testing

By comparing protocol specification and test specification, I found that SDP conformance testing was incomplete, which may lead to the incompleteness of testing, and therefore lead to difficulties in the interoperability of different Bluetooth products. I designed a set of new test cases for improvement.

### 4) Application Development

Application development is the last stage of utilization of the research result. I designed application architecture for SDP on Windows platform, in which core protocols are encapsulated in a COM server. Furthermore, I illuminated implementations of Bluetooth Neighborhood and Bluetooth Control Panel.

**Keywords:** Bluetooth, Service Discovery Protocol, Protocol Engineering, Protocol Validation, Conformance Testing