Τυχη Radioactivity Data Transfer Protocol (TDTP)

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1. Introduction

1.1. Purpose

This protocol has been designed as a domain-specific protocol for the Jugendforscht 25/26 competition for the entries of Piro E. Bakallbashi and Benedikt Mues on the research of true random number generators with radioactivity. It is used by the server device to transmit radioactivity data to a central processing device to be further interpreted. An implementation exists at https://github.com/SunkenPotato/tdtp-impl.

1.2. Outline

The protocol is based on TCP/IP, which is therefore a requirement for this protocol to be used.

1.2.1. Term definitions

1. “Unix timestamp” is defined in this article as a 128-bit, unsigned, little-endian integer storing the amount of microseconds since the Unix Epoch (Jan 1, 1970 00:00:00.000µs)

2. Protocol

2.1. Constant Definitions

Identifier	Value
`CTRL`	`0x11`
`SIG_PACKET`	`0xFF`
`EMP`	`0x00`
`SIG_EXIT`	`0x19`
`CONN_DATA`	`0x01`

2.2. Connection and data transmission

Once a client connects to the server, it is required to send the data connection flag `0x01` (`CONN_DATA`).

After that, the server will start transmitting one of the following packets:

- The empty packet `0x00` (`EMP`)
- A packet signal `0xff` (`SIG_PACKET`) followed by a Unix timestamp

`EMP` indicates it has no packets available to transmit, `SIG_PACKET` announces an outgoing packet.

EBNF:

```
ServerPacket ::= EMP | (SIG_PACKET, Timestamp)
```

Should the client wish to terminate the connection, it should send the `CTRL` signal immediately followed by `SIG_EXIT`. It may then terminate the connection or wait for the server to terminate it.