On Implementing Time

draft-ietf-ntp-implementation-guidance-00

Aanchal Malhotra
Kristof Teichel
Martin Hoffmann
Willem Toorop
Motivation

- **functionality and security** of apps hinges on some notion of time
- choose from **multiple clocks** on systems
- applications **oblivious to implications** of choosing one or the other clock for implementation
Motivation

- Result from research on effect of NTP weaknesses on DNS(SEC)
Motivation

TTL (Time to Live) = Relative time
Motivation

```c
struct RRset_t {
    uint8_t       *dname;
    uint16_t      rrtype;
    uint16_t      rrclass;
    struct timeval expiry;
    void          *rdata[];
};

if (gettimeofday(&rrset->expiry, NULL))
    perror("Could not get time of day");
else
    rrset->expiry.tv_sec += ttl;
```
Scope

- Expressing Time
  - methods to express time by applications
  - Absolute vs Relative Time

- Different clocks
  - properties of clocks maintained by digital systems
  - Native Time vs World Time

- trade-offs of using one clock over the other provides guidance to help implementers make an informed choice
Outline

• Expressing Time
  – Absolute vs Relative Time

• Keeping Time
  – Native Time vs World Time

• Trade-offs of using Native vs World Time

• Current implementation approaches

• POSIX & Windows Example.
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**History**

- Research results presented at IEPG at IETF100
- draft-aanchal-time-implementation-guidance-00 presented in NTP wg at IETF100
- Issues with terminology
  - draft-aanchal-time-implementation-guidance-01 presented in NTP wg at IETF103
  - few comments
  - draft-aanchal-time-implementation-guidance-02 presented in NTP wg at IETF105