Towards a More Effective OSC Time Tag Scheme

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Whoops

I am sorry!
mature OSC features

- We had years of experience with all the other OSC features you know and love:
  - Namespaces
  - Regular expressions
  - Datagrams
  - Network Byte Order
What went wrong?

- The only OS (IRIX) affording a good implementation was becoming irrelevant.
- Other scheduling issues dominated latency problems, i.e., Audio and MIDI I/O.
- There was no standard cross platform NTP server.
- Nobody bothered so implementations are incomplete so nobody bothered....
Time for Time-tags

- They are good for:
  - Synchronization of activity on different OSC server nodes
  - Synchronization when transport requires large updates to be fragmented
  - Jitter Attenuation
  - Simplify “Sequencer” applications
  - Record when things happened
Current Specification

- Time tags are 64-bit time used by NTP
- Servers schedule message processing to make the message update occur at the times in the tag
- Assumes the client and server clocks are synchronized
Issues

• It is still hard to find a cross-platform NTP server for ad-hoc LANs built for a particular performance

• Clients don’t know how far forward to set the tags to attenuate jitter because they don’t know what the network latency will be
Solutions 1/2

- Relativistic clocks: clients use a local 64-bit time in their tags; they include an additional tag that specifies when they sent the packet.

- Servers compute time of arrival statistics to develop a slowly varying jitter advance to rewrite timetags:
  \[ \text{new\_time} = \text{original\_time} - \text{sent\_time} + \text{jitter\_advance} + \text{arrival\_time} \]
Solutions 2/2

- If bidirectional channels are available an NTP-like scheme can be used so clients can synchronize to server clock. Clients tag their messages according to the clock approximated for each server.

- It supports senders and receivers joining and leaving network dynamically and avoids need to identify an NTP master.
Let’s fix this formally

- Please contact me if you are interested in
  - joining the “OSC time-tags” working group
  - suggesting further issues and solutions
  - describing your needs
  - sponsoring this work
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