VTP: VDIF Transport Protocol

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Introducing VDIF

VDIF is intended as a VLBI data interchange format usable for both real-time e-VLBI and non-real time data file formats

Essentially any time based data – e.g. Pulsar baseband data

Frame based format with each frame self-identifying and time tagged

Supports multi-bit data as well as multiple channels in one frame or multiple parallel streams of 1 or more channels

Format ratified at eVLBI2009 in Madrid

VDIF Frame Format

Each Data Frame 32 byte header followed by data array of user specified length

Up to one second in length

Number of Data Frames/second must be an integer

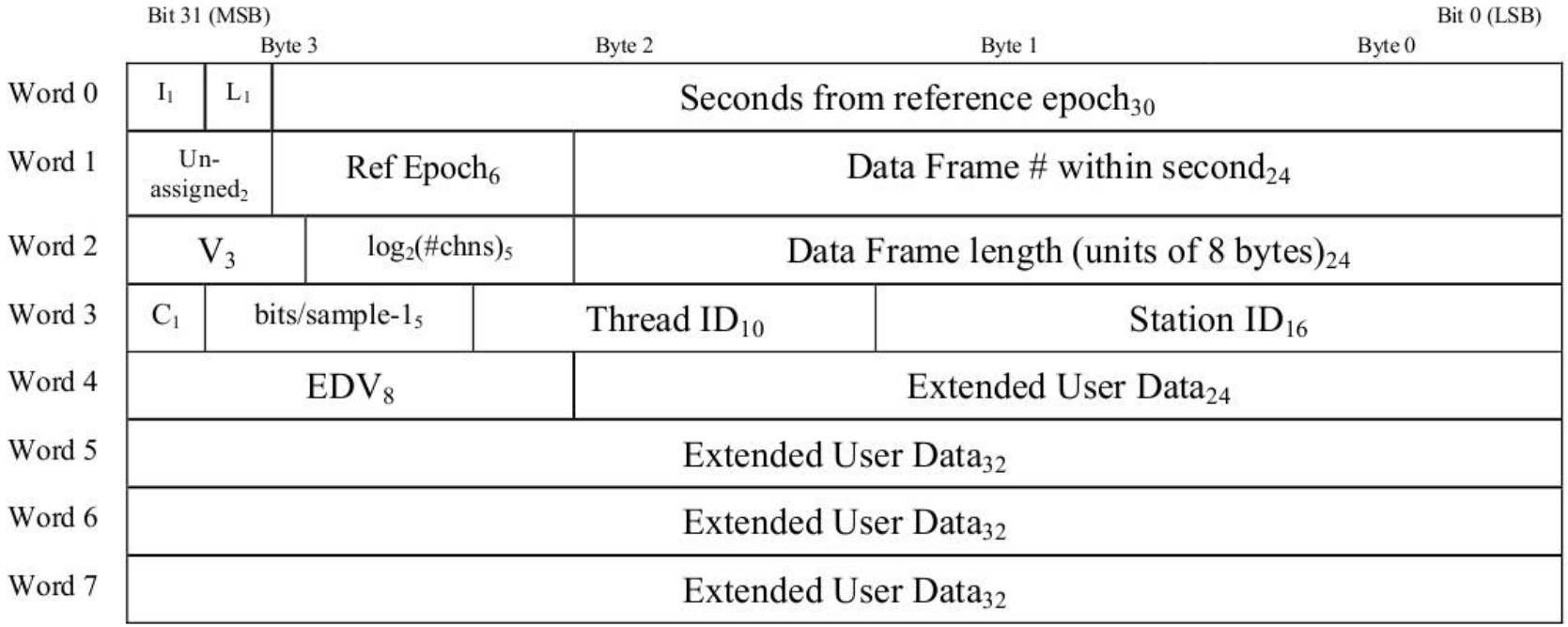
Data Frame may ***NOT*** span a second boundary

Data Frame length must be a multiple of 8 bytes

VDIF Frame Format

Frame Header contains

Time in seconds, frame number within second



VIDF Usage

DIFX has partial support for VDIF

No support yet for multiple threads

SFXC supports VDIF

LBADR has experimental support for VDIF

Mark5a VDIF conversion software written

Wettzell ▪ Tsukuba data transfer for rapid UT1-UTC determination uses VDIF

eVLA tied array output will be VDIF

dBBC and RDBE have VDIF support in

VTP: VDIF Transport Protocol

VDIF defines the format of VLBI data but does not say how we move them from one location to another

VTP defines how the frames are sent “down the wire”

Relevant for

Digital BBC Recorder (e.g. RDBE Mark5C)

Realtime eVLBI

Disk to correlator, using network transport

VTP Team

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VTP: Status

Not a huge amount of progress, no proposal ready to be endorsed

VTP: TCP

TCP supports connection oriented “reliable” stream

Bytes guaranteed to arrive in-order

No further formatting is required. VDIF frames are sent directly down wire to receiver

Same approach for any other reliable/connection oriented protocol

VTP: UDP

UDP does not guarantee delivery of packets or in-order arrival

VDIF header contains enough detail to resemble frame order, but cannot distinguish packets dropped on network from packets never sent

VDIF supports burst mode transmission

Preface each VDIF frame with 64 bit sequence number

Sequence number starts at 0

VTP: UDP continued

One VDIF frame per UDP datagram

Strongly encourage single UDP datagram per underlying layer (e.g. don't fragment over multiple Ethernet frames)

Each network stream to use unique sequence numbers

"Stream" defined Source & destination IP address and destination port

Either one thread per Stream or multiple thread per stream

Same approach for other "unreliable" transport mechanisms – e.g. raw Ethernet

Packet Flooding

Single direction UDP flows have the habit of flooding networks

Receiver MAC address/physical port gets forgotten by switch

Requires receiver to send occasional packet

Proposal to combine with receiver statistics

Once per second

frames received, out-of-order statistics etc

Next Step

Define “ACK” scheme

Finalize draft specification and distribute to community

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Thank you