VOEvent
community
proposals

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VOEvent standard for Fast Radio Bursts

arXiv:1710.08155v1 [astro-ph.IM] 23 Oct 2017

A community working together to agree a common
format for VOEvent content.

How can the VO help and encourage more
collaborations like this.

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VOEvent for FRB

VOEvent standard for Fast Radio Bursts

Use cases :

Triggering LOFAR on Effelsberg detection

Interrupt the LOFAR processing pipeline to look for corresponding event in the data buffers.

Robotic follow up of detentions by Apertif

Broadcasting VOEvents for robust candidates enabling 3rd party follow up searches.

Coordinated follow up campaigns

Broadcasting telescope activity, enabling coordinated searches.

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VOEvent standard for Fast Radio Bursts

Describing the science works.

Flexible structure of the VOEvent <what> combined with
the structured language of UCDs and units works
well to describe the science.

FRB community has worked together to agree a common
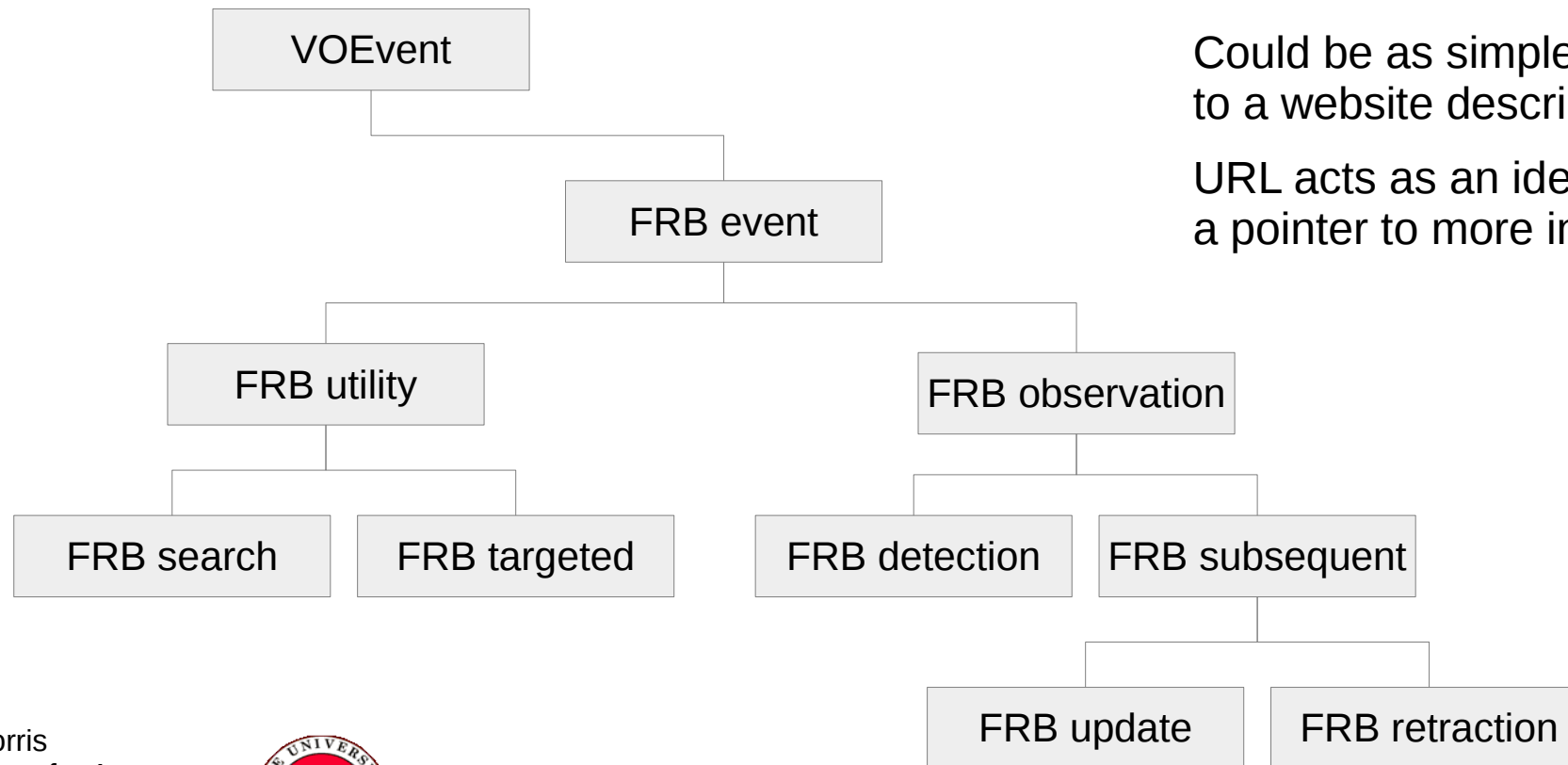set of parameters required to describe a FRB.

How can the VO help ?

Provide a community site for sharing this Information ?

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VOEvent standard for Fast Radio Bursts

What is missing – event type   How to say "this is a FRB event" ?

```
                    ┌──────────────┐
                    │   VOEvent    │
                    └──────┬───────┘
                           │
                    ┌──────┴───────┐
                    │  FRB event   │
                    └──────┬───────┘
            ┌──────────────┴──────────────────┐
      ┌─────┴──────┐                    ┌──────┴─────────┐
      │ FRB utility│                    │FRB observation │
      └─────┬──────┘                    └──────┬─────────┘
       ┌────┴────┐                        ┌────┴─────────┐
  ┌────┴────┐ ┌──┴──────────┐      ┌───────┴───┐ ┌────────┴──────┐
  │FRB search│ │FRB targeted│      │FRB detection│ │FRB subsequent│
  └─────────┘ └─────────────┘      └───────────┘ └────────┬──────┘
                                              ┌────────────┴─────┐
                                        ┌─────┴────┐ ┌───────────┴──┐
                                        │FRB update│ │FRB retraction│
                                        └──────────┘ └──────────────┘
```

Could be as simple as just a URL to a website describing the type.

URL acts as an identifier and a pointer to more info.

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VOEvent standard for Fast Radio Bursts

Structure in the identifier

```
ivo://au.csiro.atnf/parkes#FRB1405141714/56791.71885417
```

```
ivo://[institute]/[instrument]#FRB[YYMMDDhhmm]/[MJD]
```

This convention is used to filter public streams
for FRB events.

Clever solution to a local problem, but it won't scale to the global community.

The IVOA needs to provide better tools to solve this.

- even if it is just a public list of known TLAs.

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VOEvent standard for Fast Radio Bursts

Summary -   People are building on the VOEvent specification
to create their own structures.

How can the IVOA help :

Add an event type field.

Provide a site for sharing information about event types.

Make it easier to register an IVOID.

* does event id need to be an ivoid ?

Advice on adding structure in the ivoid ?

* experience from other systems
* best practice advice

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JSON VOEvent

What   Define an alternative JSON serialization format for VOEvent.

No semantic change.

Why   Simpler to parse using Python libraries.

Cost   Makes registration slightly more complex.

Will services still be required to provide XML format ?

JSON clients may only be able to access a subset of services.

Is this ok ?

Tell us what you think – <voevent@ivoa.net>

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LSST events

LSST *internal* alert processing

Not using VOEvent or VTP – primary reason is data rate

10^3 events per 39 sec visit

Apache Kafka as the transport protocol

Apache Avro as the data format

LSST are actively working within the IVOA

IVOA time domain group are working with LSST

Experience from LSST will influence future development of VOEvent

Kafka and/or Avro may be part of a future version of VOEvent

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Kafka/Avro VOEvent

What   Define an alternative serialization format using Apache Avro.

Why   Binary transport format, more suitable for high data rates.

Cost   Makes registration slightly more complex.

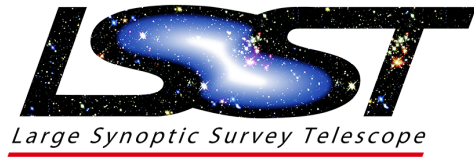Will services still be required to provide XML format ?

Can we have have Avro only services ?

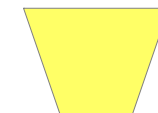Is this the right time to do this ?
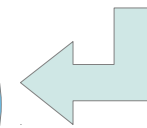
Tell us what you think – <voevent@ivoa.net>

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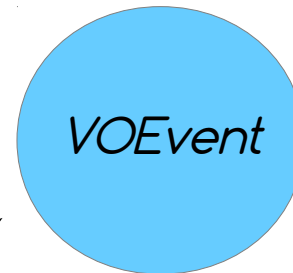Edinburgh University
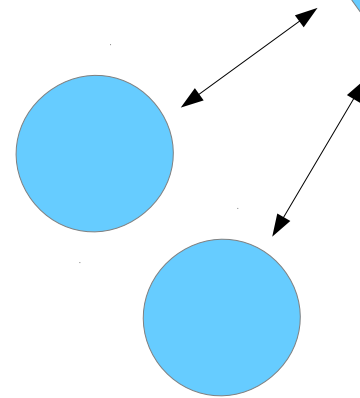October 2017

Kafka/Avro VOEvent

Community broker

High data rate (> 10^3 Hz)

Filtering and processing

VOEvent

Broadcast as VOEvent

Low data rate (< 10 Hz)

Existing VOEvent
infrastructure
and community

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Light curve data model

Light curve data model

Simple model for embedding a light curve.

Required fields

time.epoch	The measurement time
phot.flux	The measured flux

Optional defined fields

phot.flux;stat.error	The measurement error
phot.flux;stat.min	The limiting magnitude
instr.filter	The measurement filter

+ Simple design

- Not linked to time series cubes

+ Not as complex as time series cubes

Is this enough for 80% of our use cases ?

Tell us what you think – <voevent@ivoa.net>

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Associated sources

Associated sources — Simple model for listing sources close to an event.

Required fields

meta.id.parent	The identifier of the source
meta.table	The catalog for the source

Optional defined fields

meta.ref.uri	URI for the catalog (URL)
phys.angSize	Angular distance from the point
pos.eq.ra	Right ascension of the source
pos.eq.dec	Declination of the source
pos;stat.error	Error of the position
stat.probability	Strength of the association

+ Simple design

- Not linked to other VO standards

+ Not as complex as other VO standards

Is this enough for 80% of our use cases ?

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