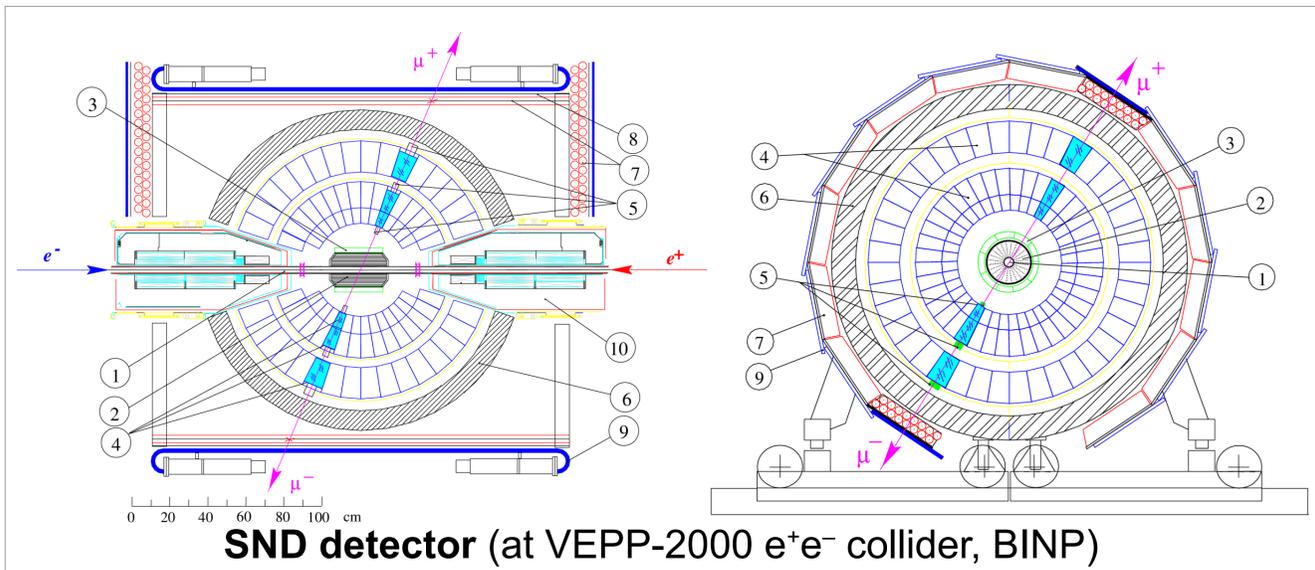


Experiment Management System for the SND Detector

The first stage: database interaction. Konstantin Pugachev, BINP, Russia.

- The current system consists of a set of applications. Some of the system functions have not been implemented yet; some solutions are too old.
- The new system is meant to be web-oriented. It should replace the most inconvenient UI solutions and implement the new features being waited.
- One important purpose of the new system is to provide hierarchical database configuration editing. The current system requires user's knowing relational database systems and/or C++ while editing the configuration.

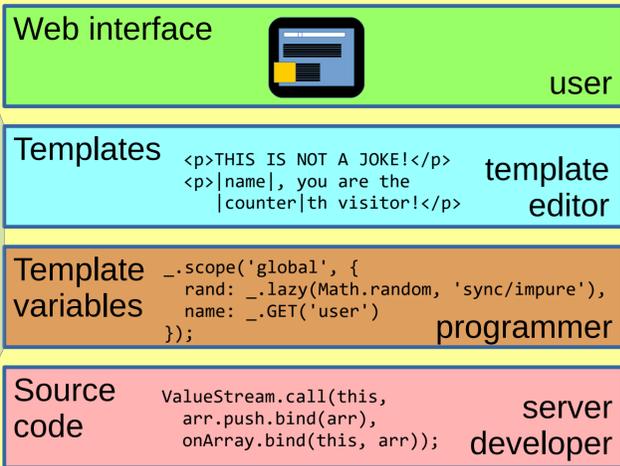


SND detector (at VEPP-2000 e⁺e⁻ collider, BINP)

Template engine

```
import namespace1
import functions
include header.tpl as header
include footer.html as footer
-----
||header|| ← variable; HTML is not escaped
<h1>Hello, |name|!</h1> ← condition block
|#if (equals counter 1000000)|
  <p>THIS IS NOT A JOKE!</p>
  <p>|toupper name|, YOU ARE |counter|th visitor!</p>
#else
  <a href=".">refresh</a>
#end
||footer|| ← variable; HTML is escaped
← applied function; HTML is escaped
```

Layers of abstraction



Editing hierarchical objects

- Table hierarchy in the SND DB (RDB)
- Preventing from deleting/editing using automatic smart cloning
 - Copying only when the node is edited or depend on some edited nodes
- Adding metadata automatically
- Tree editor (Web UI)
- Reading object structure from information_schema and server configuration

Homogeneity of values

```
module.exports = function(_) {
  _.scope('test', {
    sum: _.func(function(a, b){ return a+b; })),
    sum_a: _.func(function(a, b, cb) {
      setTimeout(function(){ cb(a+b); }, 100);
    }, 'pure/async'),
    one: 1,
    one_a: _.lazy(function(cb) { cb(1); }, 'pure/async')
  });
};
```

Synchronous/asynchronous code homogeneity

```
import test
-----
|sum one one | OK
|sum one one_a | OK
|sum one_a one_a | OK
|sum_a one one | OK
|sum_a one one_a | OK
|sum_a one_a one_a | OK
```

There is no difference between synchronous/asynchronous calls for template editors.

All the values look as they were got in synchronous way, no matter what synchronous/asynchronous function/value combination is used.

They may be also pure or impure.

Tools

- Node.js
- mysql (npm: mysql)
- node-static (npm: node-static)
- PEG.js (npm: pegjs)
- Sessions (npm: sessions)
- crypt.js (from tripcode on github.com/KenanY)
- Formidable (npm: formidable)
- ...

Object configuration

```
_.editor({
  db: 'rundbase',
  table: 't_trigger',
  leafs: [
    't_trigger/t_triggeremcsimthrs',
    't_triggeremcl/t_triggeremclmasks'
  ],
  [
    {
      path: 't_trigger',
      data: { title: 'Trigger' },
      fields: [
        { name: 'c_comment', data: { title: 'Comment' } },
        { name: 'c_brptmask', data: { title: 'BRPT mask' } }
      ]
    },
    {
      path: 'cflt10:t_triggerangs/admbase.t_person',
      data: { title: 'Author' },
      fields: [
        { name: 'c_lastname', data: { title: 'Last name', flag5: true } }
      ]
    }
  ]
});
```

node to edit

reverse-referenced nodes

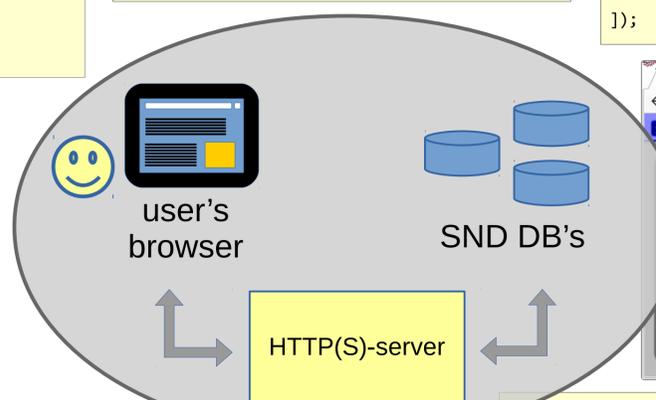
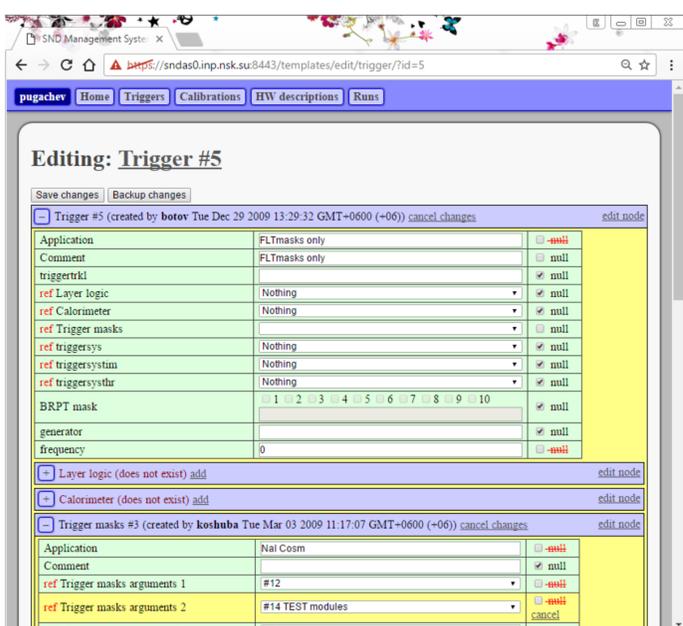
child node is accessed by its selector

attributes to edit

arbitrary data

Appearance

* the original version is in Russian



Run	Time	E, MeV	N, Hz	Live, %	Events	Completion reason	Comment
23767	09:27:39 - 11:14:53	0	157	99	999998	events limit	Experiment setup: no beams
23768	11:16:36 - 13:03:52	0	157	99	999997	events limit	Experiment setup: no beams
23769	13:03:27 - 14:52:57	0	157	99	999998	events limit	Experiment setup: no beams
23770	14:54:35 - 16:42:02	0	157	99	999996	events limit	Experiment setup: no beams
23771	16:43:38 - 18:31:14	0	157	99	999996	events limit	Experiment setup: no beams
23772	18:33:23 - 20:21:07	0	157	99	999999	events limit	Experiment setup: no beams
23773	20:22:42 - 22:10:43	0	156	99	999996	events limit	Experiment setup: no beams

- A simple web-server has been created using Node.js framework.
- A template engine is designed. The main feature is homogeneity of synchronous and asynchronous values.
- A hierarchical objects (mapped on relational DB) editor has been implemented.
- The server allows user to read and modify experiment configuration, conditions and metadata.
- This is the first part of management system refining. Some new changes are coming soon.