

# Web based data visualization and processing tools for ASEC and SEVAN particle detector networks (**DVIN 5.0**)

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## Why was developed DVIN5

- Data deployment from DAQs of CR monitors to central server
- Data storing
- Data processing ( correction by pressure, simple filtering ...)
- presentation of data in Internet
- ability to develop network of DVINs with synchronized data

## Used Technologies

- Server side scripting PHP
- Client Side technologies Ajax
- Server-client interface at the base of JSON
- Storage type MySQL 5.0
- Raw data format in XML
- Meta information (layouts) XML
- Configuration files XML

# Presentation of data in XML format

- XML = E~~x~~tensible ~~M~~arkup ~~L~~anguage
- XML means “Extensible Markup Language” extensible - not fixed format like HTML
- XML is a metalanguage - a language for describing other languages
- Enables you to define your own customized markup languages for different classes of documents
- “tag based”
- Define data in a format that is machine AND human readable
- Fully portable

Independent of platform (e.g., Linux/Windows/Unix/Palm)

Independent of language (e.g., Java, C++, VB)

# Another Data formats and problems for software developers

- Tab/comma separated or predefined field length formats (Romantic 90-th, qbasic, turbo pascal and norton commander, unix is only for advanced users ... no spam in my mailbox)
- Digital data (I need support of this data in PHP, Java, C/C++ ... who can help me ?)
- Time stamp formats are different sometimes very exotic.
- what about validation of data formats ? Sometimes my software faults during the processing of large amount of data because of garbage in it ( once I have found fragment of assembler code in data ). We have no stable software for fully automated systems ( alerting systems, software for data processing on the fly )
- differences in data format structure, internal data format makes the systems which works with different type of data very unstable because we have to develop software by method of Frankenstein.

# Sample XML for CR Monitors

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<MonitorData>
```

```
  <Data installation="snt" layout="2007-07-05T16:55:02.35">
```

```
    <Time>2007-08-15T19:03:00.0000000+05:00</Time>
```

```
    <Duration>P60.0000000</Duration>
```

```
    <Value>20069 23971 19991 4155 1130 1542 ...</Value>
```

```
  </Data>
```

```
  <Data installation="snt" layout="2007-07-05T16:55:02.35">
```

```
    <Time>2007-08-15T19:04:00.0000000+05:00</Time>
```

```
    <Duration>P60.0000000</Duration>
```

```
    <Value>19069 22951 19681 2145 1423 1432 ...</Value>
```

```
  </Data>
```

```
  ...
```

```
</MonitorData>
```

# Download data in XML format

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<Root>
```

```
<Information ID="0">
```

```
<Monitor>Nor-Amberd Neutron Monitor</Monitor>
```

```
<Group>Pressure Uncorrected</Group>
```

```
<TimeSeries>Count Rate dead_time: 0.4us</TimeSeries>
```

```
</Information>
```

```
<Statistics ID="0">
```

```
<Avg>28802.7557252</Avg>
```

Min, Max, StdDev, RelError ...

```
<NumOfEl>1441</NumOfEl>
```

```
</Statistics>
```

```
<Datas>
```

```
<Data><Time>2008-05-27T22:42:00+00:00</Time><Value ID="0">28371</Value></Data>
```

```
<Data><Time>2008-05-27T22:44:00+00:00</Time><Value ID="0">28197</Value></Data>
```

...

```
</Datas>
```

```
</Root>
```



# FAQ or Why XML is not used in CR softwares ...

XML files are very big, so we will use “classic” comma separated files  
*bz2 module ... - archiving on the fly will make them several time smaller*

XML database is not so fast as MySQL, PostgreSQL or Oracle  
*XML maybe used for transmitting and storing “raw” data, but as an operating DB again will be used DBM*

Implementation of software is not very easy  
*simplexml will save time.*



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```

...

```
</Datas>
```

```
</Root>
```

# AJAX (Asynchronous Javascript XML) technology for Rich Internet Applications

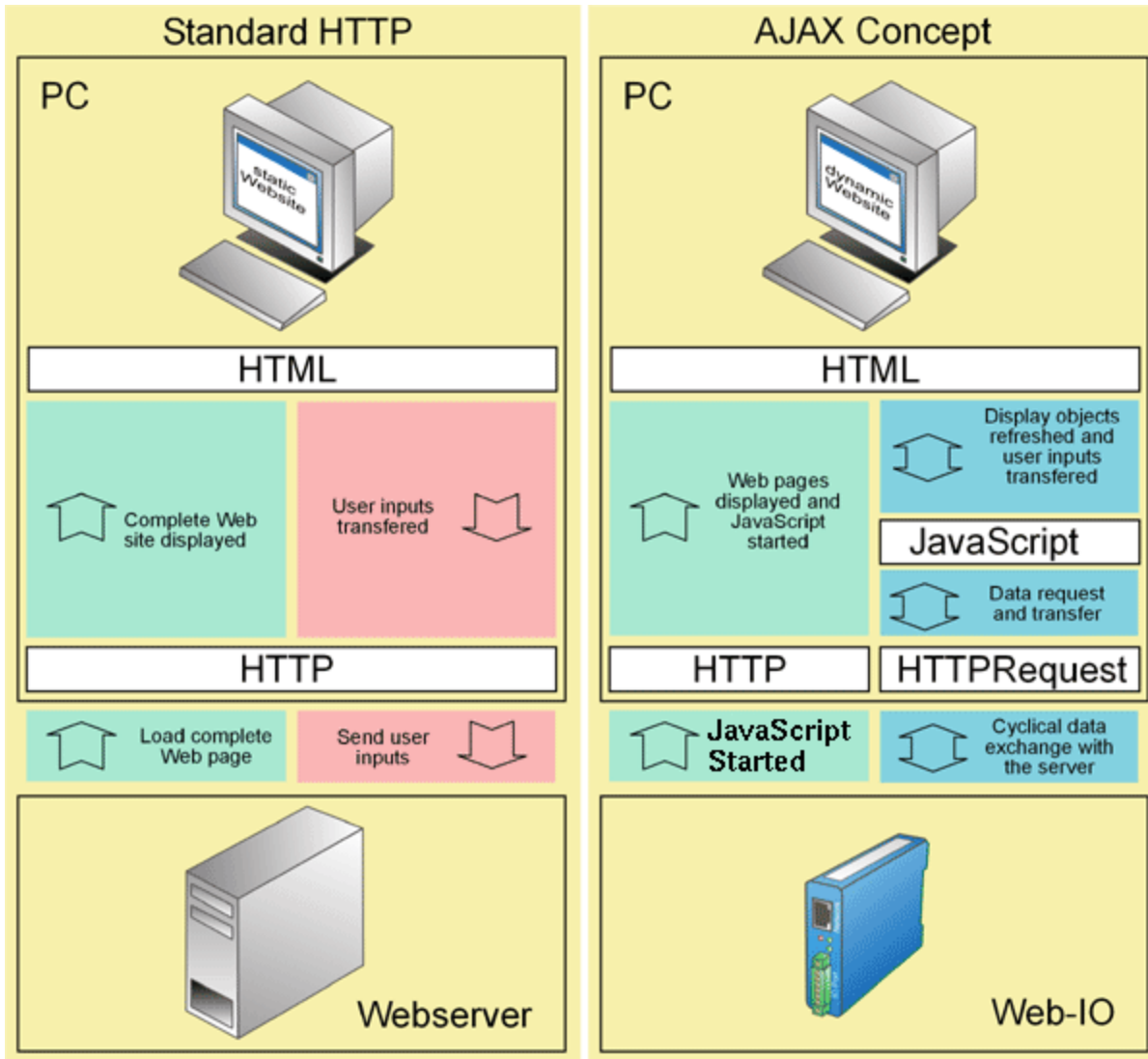
What is Ajax ?

Ajax is just a style of design,  
one that makes feel less web  
and more desktop

Why Ajax

- Reduce Network Traffic
- Increase Speed
- Enhance User Experience

# AJAX Diagram



# Google Suggest (Ajax Example)

[opping](#) [Gmail](#) [more](#) ▼

eghikyan@gmail.com



cosmic ray|

cosmic rays wikipedia	116,000 results
cosmic rays of death	480,000 results
cosmic rays wiki	145,000 results
cosmic ray's starlight café	16,800 results
cosmic ray data	4,410,000 results
cosmic ray energy	2,400,000 results
cosmic rays and cloud formation	627,000 results
cosmic ray collector	410,000 results
cosmic ray sources	1,650,000 results
cosmic ray speed	1,750,000 results

[Advanced Search](#)

[Preferences](#)

[Language Tools](#)

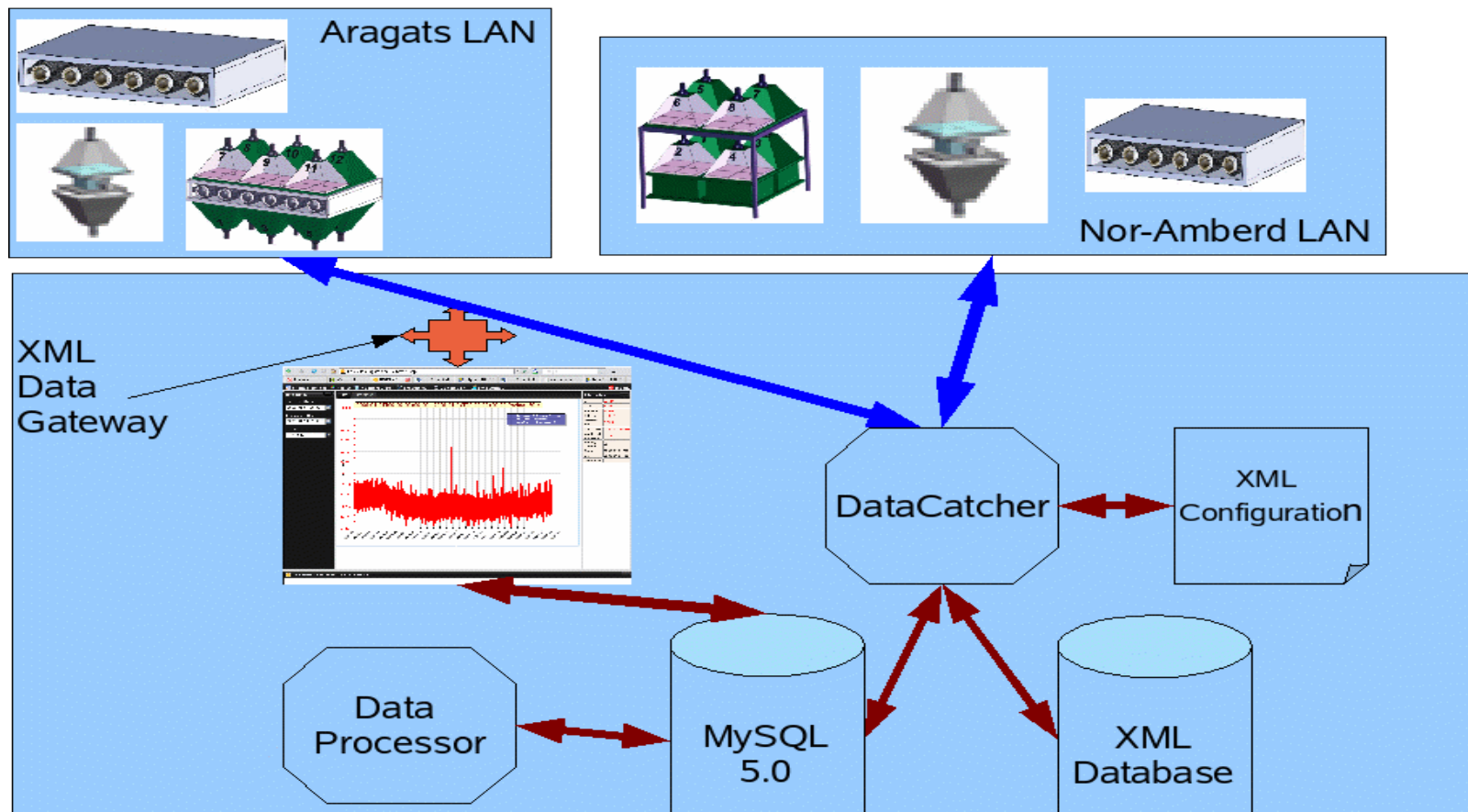
[Learn more](#)

[close](#)

As you type,

s.

## Structure of DVIN5 in CRD Network

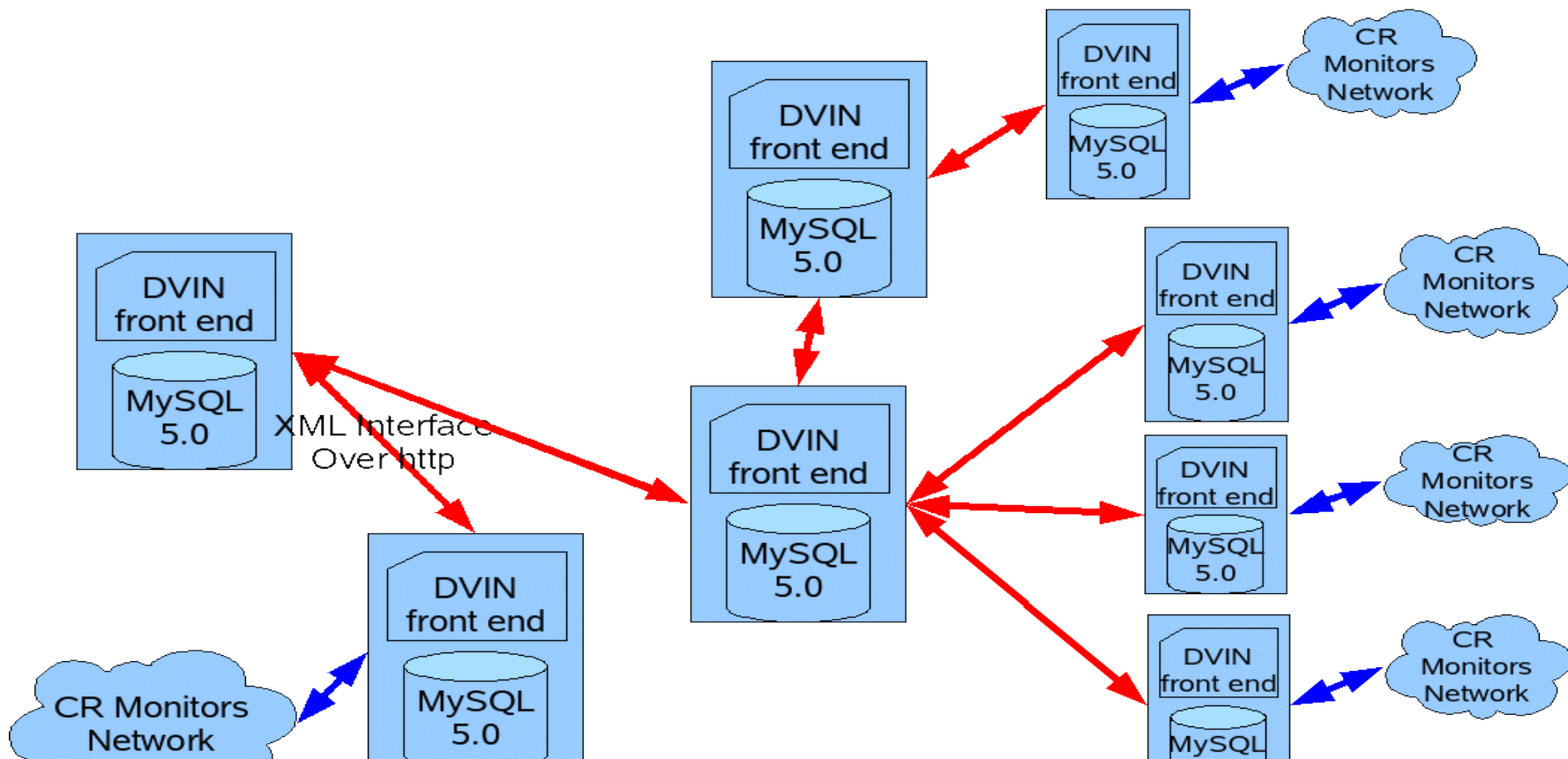


# XML Data gateway – interface for data exchange between DVINs and other software

- get full catalog of available monitors, subgroups and timeseries
- monitors information in XML format (contact information of institution, location, technical description ... )
- range of data
- statistics of data ( without data )
- plot of range
- figure of monitor



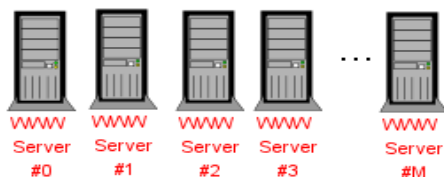
# Development of DVIN Networks



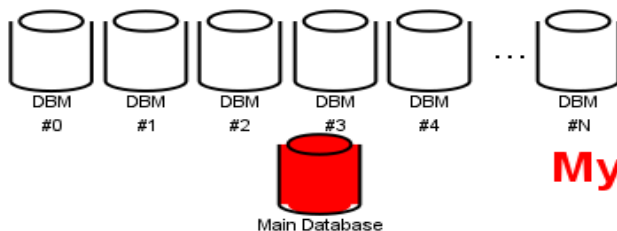




**JSON Interface**



**PHP - DB Interface**



**MySQL Replication Interface**

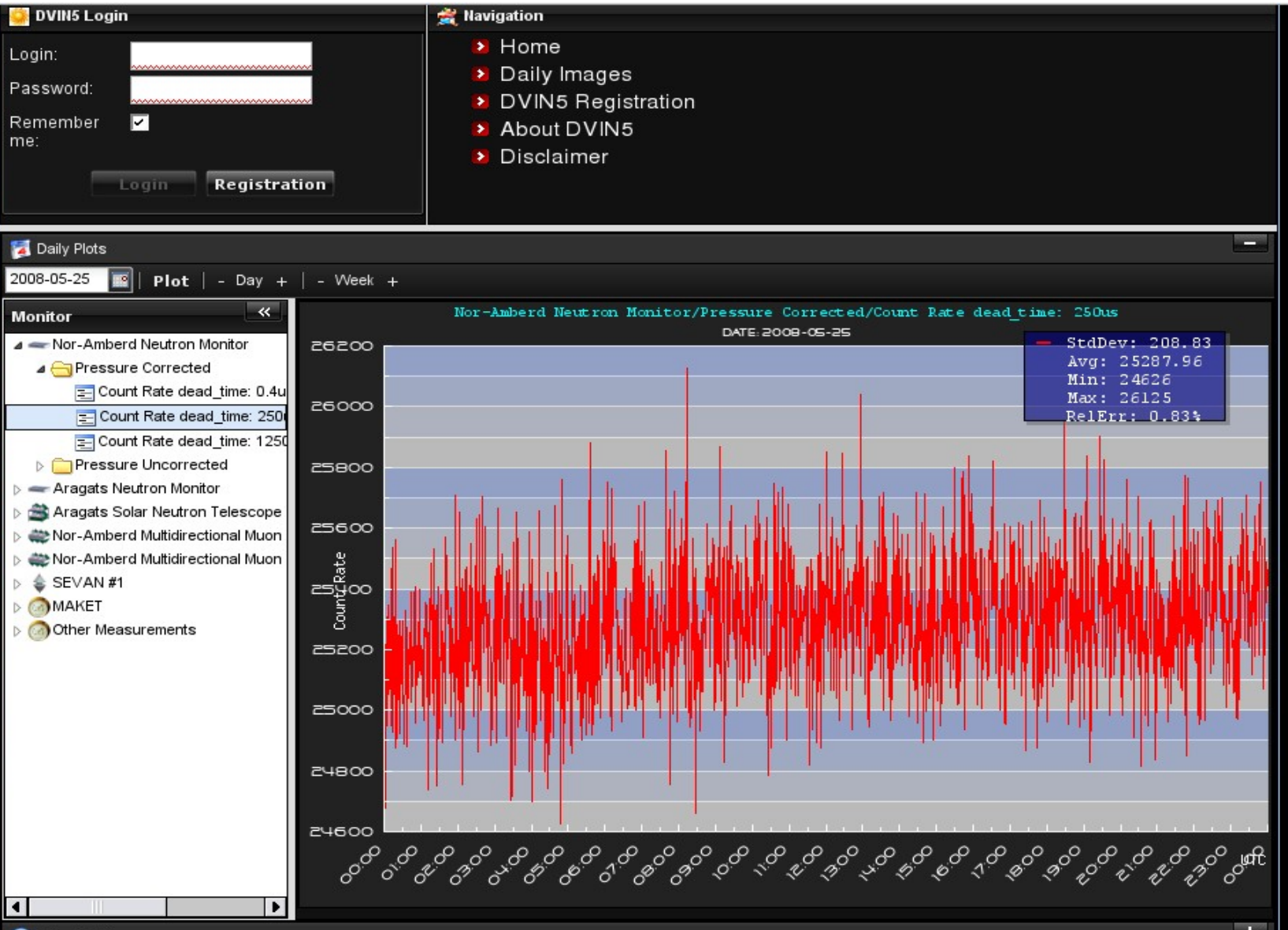
DataCatcher

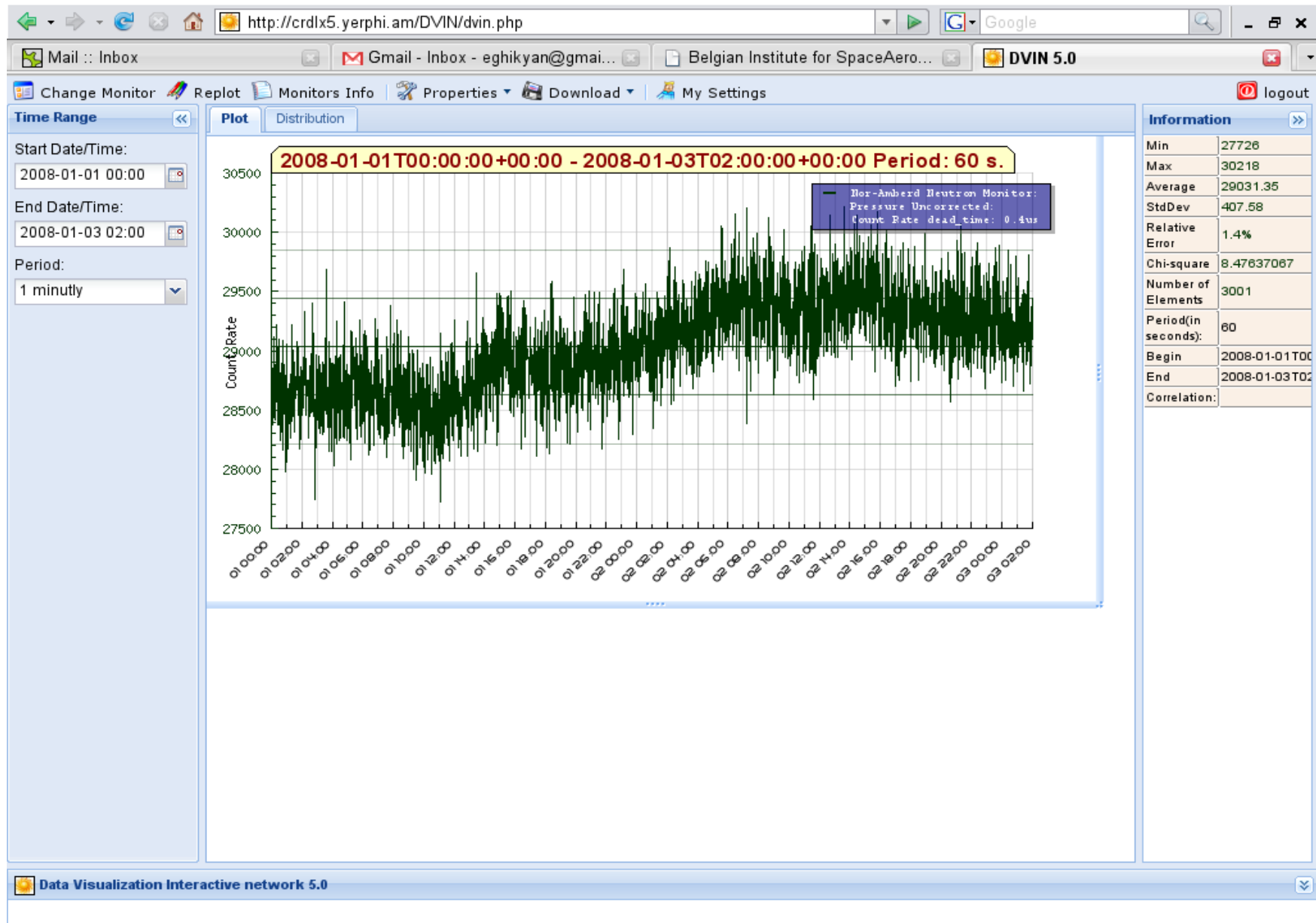
**XML Interface**

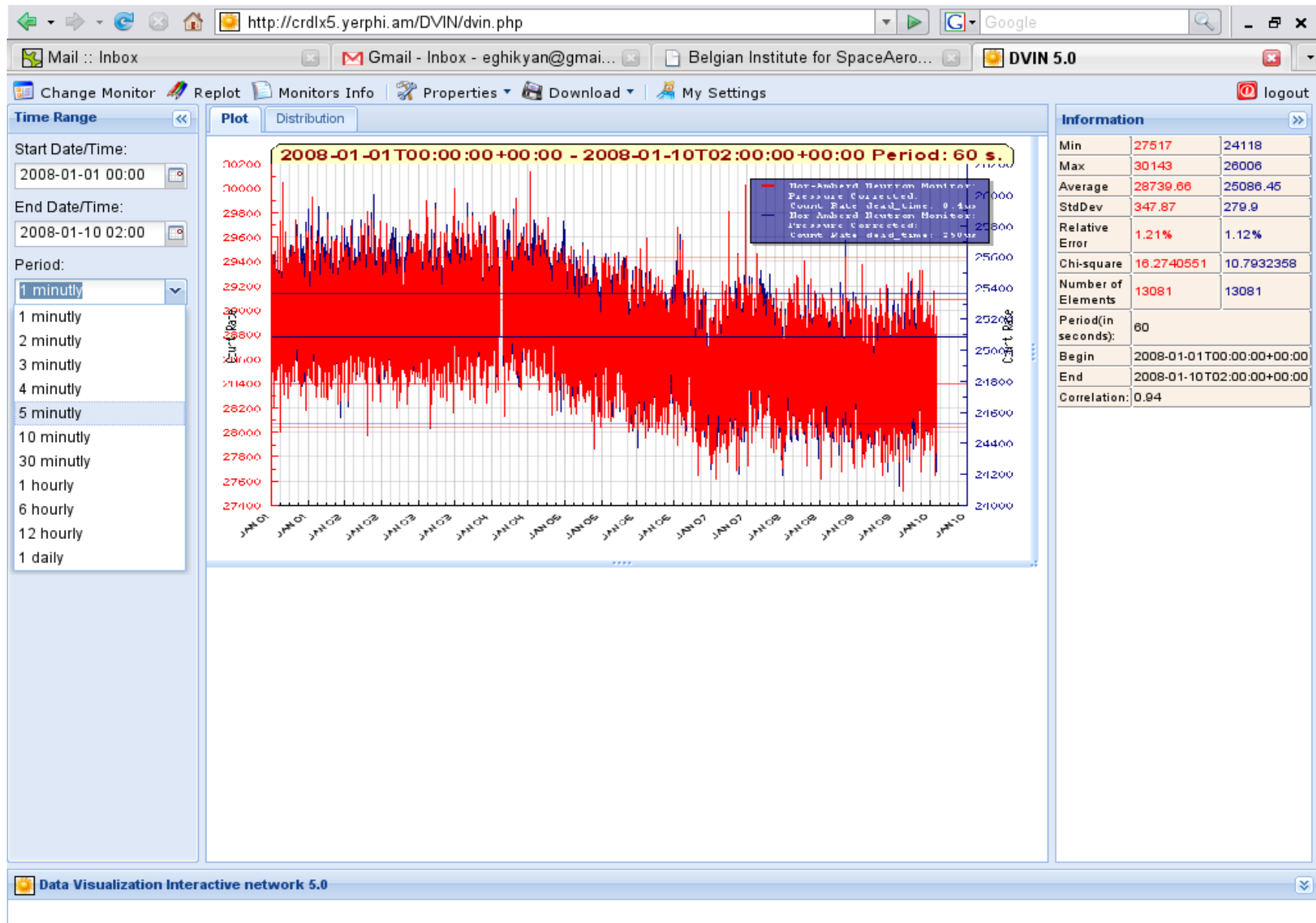


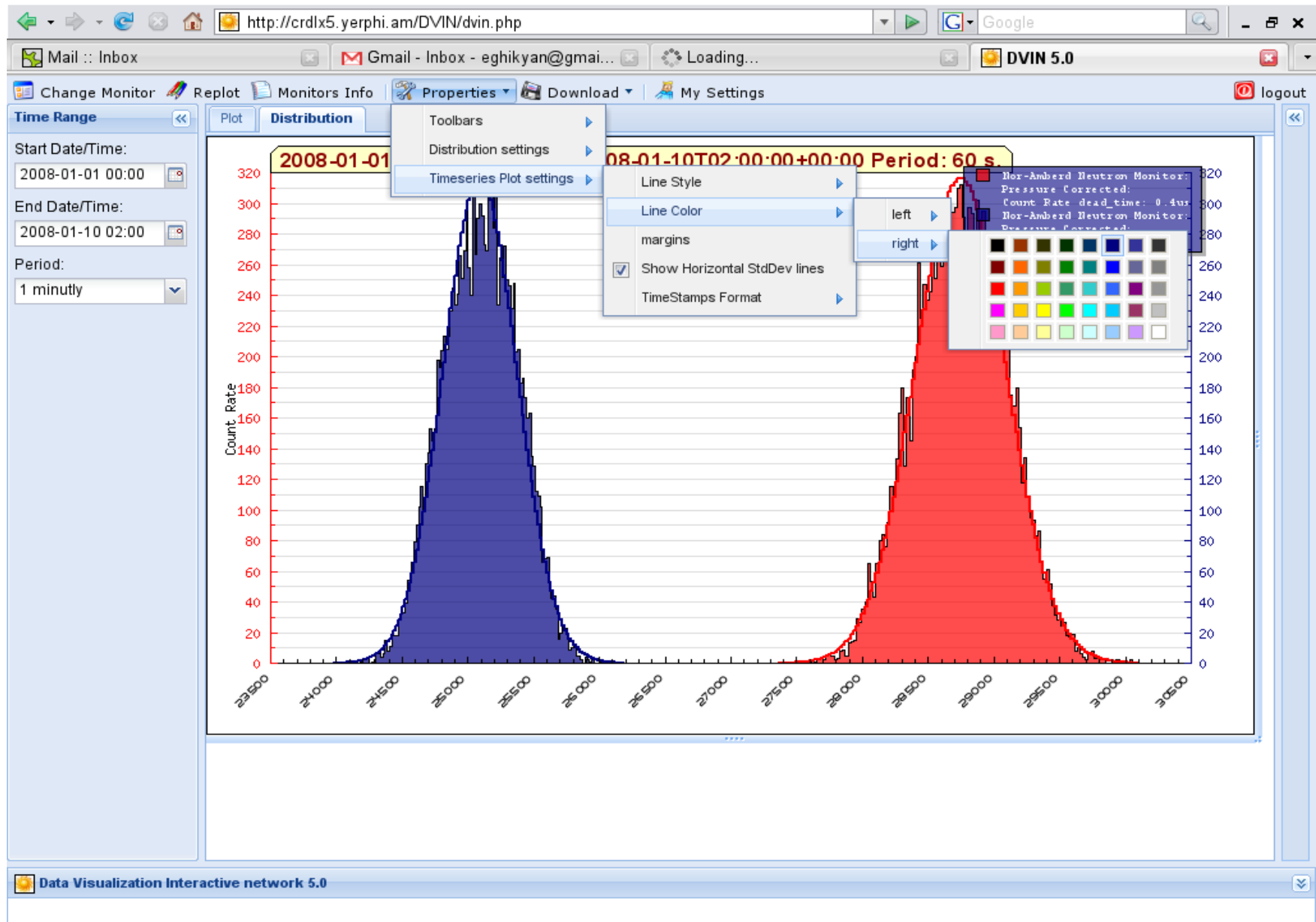
# DVIN Load Balancing

# DVIN5 Login Page











Browser window: <http://crdlx5.yerphi.am/DVIN/dvin.php>

Navigation: Change Monitor | Replot | Monitors Info | Properties | Download | My Settings | logout

Time Range: Start Date/Time: 2008-01-01 00:00:00 End Date/Time: 2008-01-10 00:00:00 Period: 60 s

ASEC Monitors Information

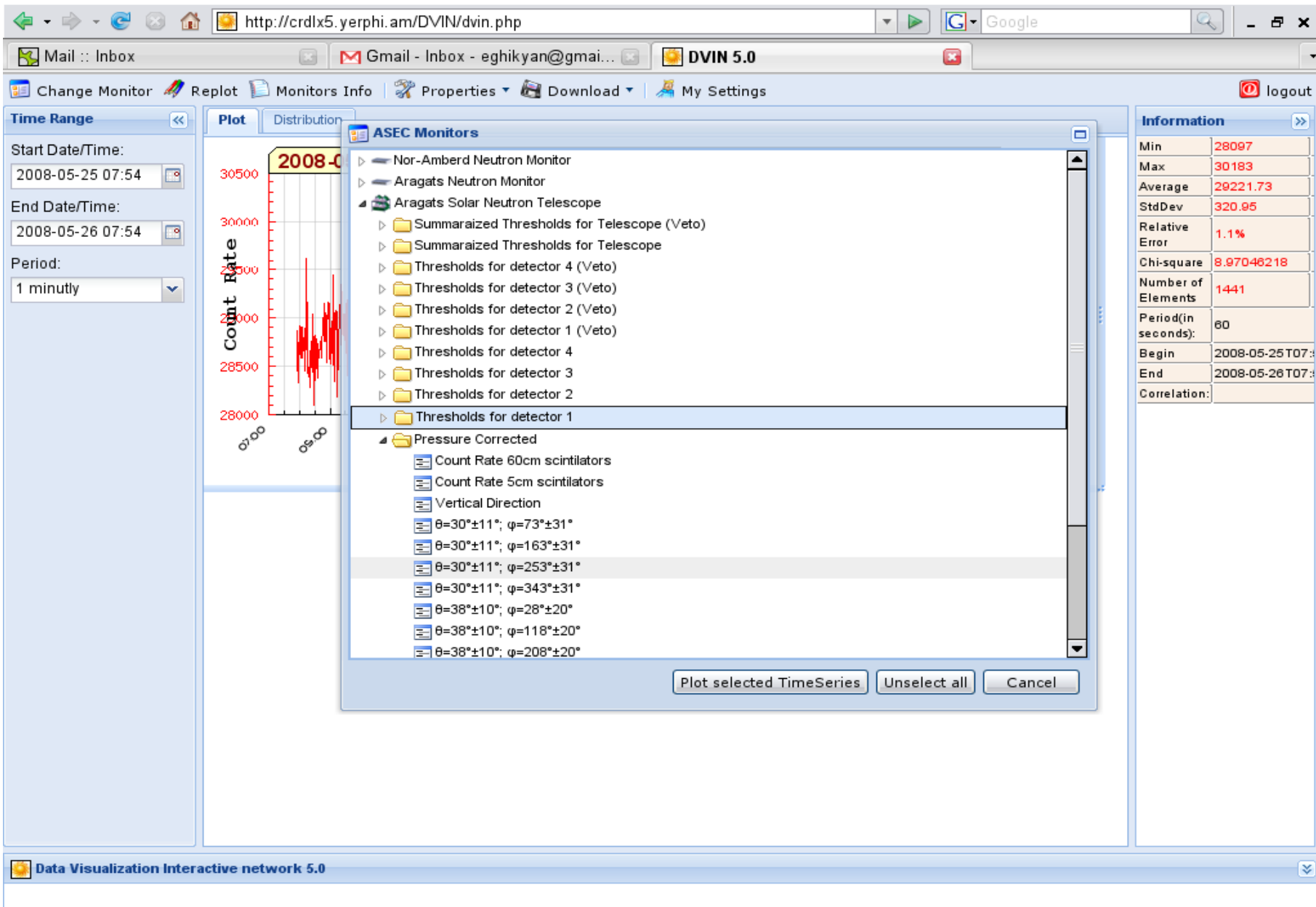
Monitor:

- Nor-Amberd Neutron Monitor
- Aragats Neutron Monitor
- Aragats Solar Neutron Telescope**
- Nor-Amberd Multidirectional Muon
- Nor-Amberd Multidirectional Muon
- SEVAN #1
- MAKET

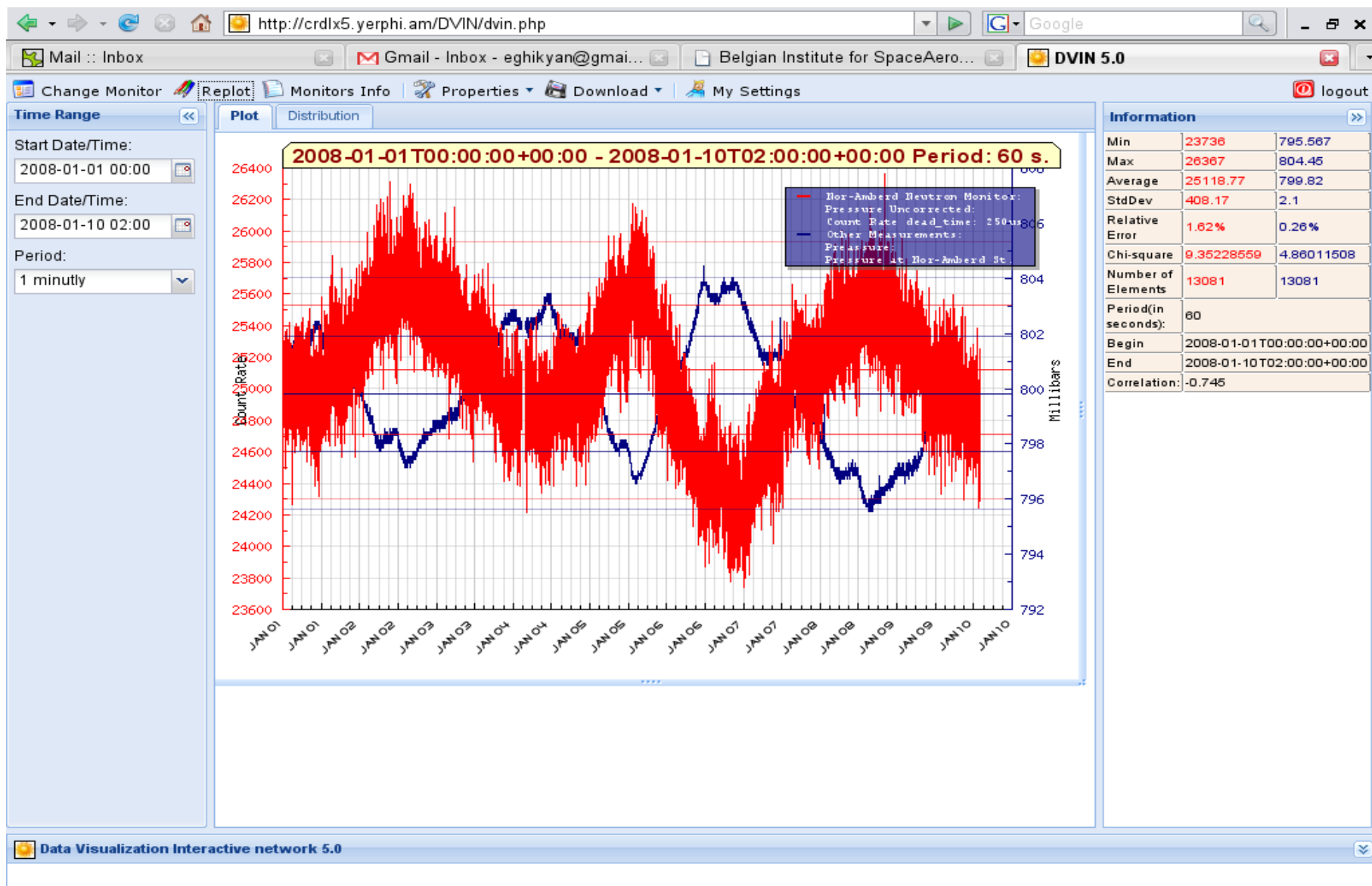
Information

Close

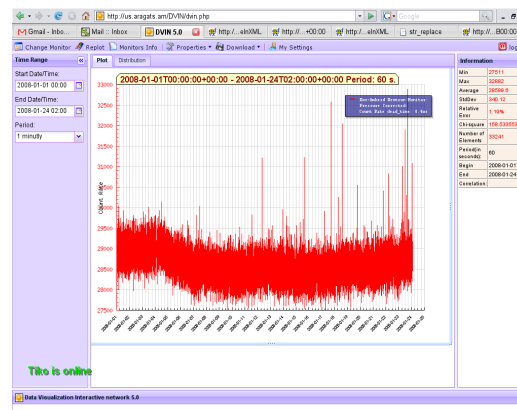
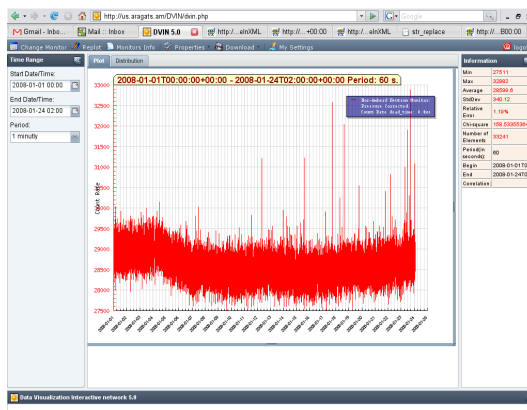
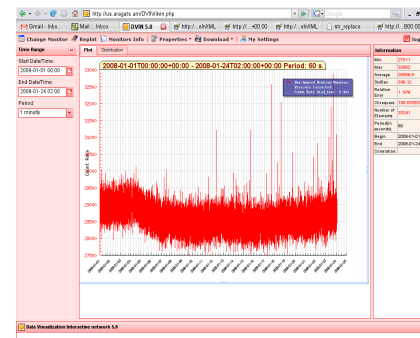
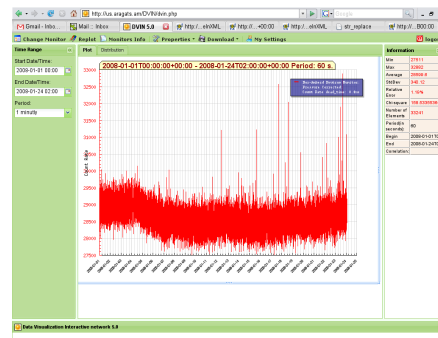
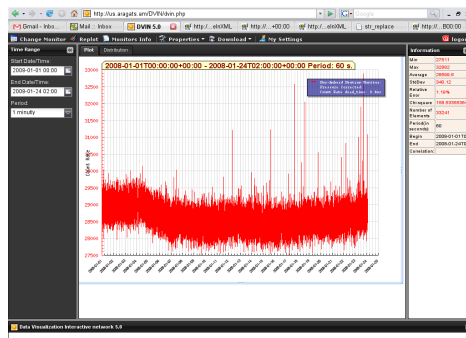
Data Visualization Interactive network 5.0







# Not very important slide.



URL: <http://aragats.am/DVIN/>

Please do not hesitate to send us any bug descriptions and suggestions for future development of DVIN.

Thank you.