Establishment of data center in Asia and west Pacific area

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I FREE/J AMSTEC
Upgrading status for seismic station

New recorder and offline station

New recorder and telemetric station

New recorder and offline station
Dec. 2004 a week ago before mega quake

Dec. 26, 2004 Mw > 9
Mar. 28, 2005 M = 8.7
Federation of Digital Broad-Band Seismograph Networks

a global organization
Activities of FDSN WG-1
Realtime data exchange

- Realtime data transmission through the internet is common.
- SEED is used as data exchange format even in realtime.
- Software to realize realtime data exchange: Antelope, Earthwarm, SEEDlink...

Offline retrieval by NetDC
Most of the broadband stations in this area are connected to the internet these days…
Network Data Center system

Users' PC

IFREE/JAMSTEC DC

Data Center B

IRIS DMC

Data Center D
Pacific Region Geophysical Network Data Center of IFREE/JAMSTEC has archived broadband seismograms, geomagnetic, and geodetic data which are recorded by geophysical observation network in northwest Pacific region. These data are distributed through our web site using the Java-RMI based network data center system (Takeuchi et al., 2002). While developing this system we have realized that the current approach has several problems to build network data center system:

• It is necessary to install server software at each data center.

• It is possible that original data source might become obscure.
Using web services technology, differences among data centres are accommodated through WSDL.
Access to services

- GDS Client uses **get** and **post** method of http protocol to access data servers.

To access to other services, it is necessary to prepare WSDL and XSLT files.
GDSClient software

• **http://www.jamstec.go.jp/pacific21/**

• Following data centers are available through this software
  - IFREE NI NJA (Continuous/Event data)
  - OHP DMC NI NJA (Cont./Event)
  - IRIS WebRequest(Cont), WilberII(Event)
  - ORFEUS WebRequest, WilberII
  - IFREE Synthetic Seismograms
XML representation of SEED format for extension of current SEED format
XML Representation of SEED format

- eXtensible Markup Language (XML) is a text-based language.
- XML documents use `tags’ to establish hierarchical data structure and named values.
- XML can be used for most of all major platforms.
- XML is a basic technology for networking.
Advantages of using XML

• Header structure of SEED is modular, which can be easily represented by XML.
• Data structure of XML is flexible, because length of any fields is not fixed.
• XML has its schema language – XML-Schema, which can be used for validation of XML document.
Design requirements of conversion of SEED to XML representation

- Entities described in the current SEED headers should be identical to those described in XML representation.
- Changes in structures of SEED headers should be as small as possible.
- XML document should have structures that allow validation with XML-Schema language.
Figure 4: Format Object Organization Within a Logical Volume
Conversion of control header

<?xml version="1.0" ?>
<xseed>
  <volume_control_header>
    <!--For blockettes in volume control header -->
  </volume_control_header>
  <abbreviation_dictionary_control_header>
    <!--For blockettes in abbreviation dictionary control header -->
  </abbreviation_dictionary_control_header>
  <station_control_header>
    <!--For blockettes in volume control header -->
  </station_control_header>
  <timespan_control_header>
    <!--For blockettes in volume control header -->
  </timespan_control_header>
</xseed>
Conversion of blockette

Blockette will be represented as follows with blockette name as 'blockette_name', and blockette type as '555',

```xml
<blockette_name blockette="555">
    <!-- Fields to be inserted -->
</blockette_name>

'Length' field is not required in XML representation.
Example of conversions:
Volume identifier blockette

<volume_identifier blockette="010">
  <version_of_format>Trial</version_of_format>
  <logical_record_length>12</logical_record_length>
  <beginning_time>1992-01-01T00:00:00.0000</beginning_time>
  <end_time>1992-01-02T00:00:00.0000</end_time>
  <volume_time>1993-01-29</volume_time>
  <originating_organization>IRIS_DMS</originating_organization>
  <label>Data for 1992-01-01</label>
</volume_identifier>
## Volume Identifier Blockette

<table>
<thead>
<tr>
<th>Name:</th>
<th>Volume Identifier Blockette</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blockette Type:</td>
<td>010</td>
</tr>
<tr>
<td>Control Header:</td>
<td>Volume Index</td>
</tr>
<tr>
<td>Field Station Volume:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Station Oriented Network Volume:</td>
<td>Required</td>
</tr>
<tr>
<td>Event Oriented Network Volume:</td>
<td>Required</td>
</tr>
</tbody>
</table>

This is the normal header blockette for station or event oriented network volumes. Include it once at the beginning of each logical volume or sub-volume.

**Sample:**

```
0100009502.1121992, 001, 00:00:00.0000-1992, 002, 00:00:00.0000-1993,
029-IRI0_DMC-Data for 1992, 001-
```

<table>
<thead>
<tr>
<th>Note</th>
<th>Field name</th>
<th>Type</th>
<th>Length</th>
<th>Mask or Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Blockette type 010</td>
<td>D</td>
<td>3</td>
<td>&quot;#&quot;</td>
</tr>
<tr>
<td>2</td>
<td>Length of blockette</td>
<td>D</td>
<td>4</td>
<td>&quot;###&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Version of format</td>
<td>D</td>
<td>4</td>
<td>&quot;.# .#&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Logical record length</td>
<td>D</td>
<td>2</td>
<td>&quot;##&quot;</td>
</tr>
<tr>
<td>5</td>
<td>Beginning time</td>
<td>V</td>
<td>1—22</td>
<td>TIME</td>
</tr>
<tr>
<td>6</td>
<td>End time</td>
<td>V</td>
<td>1—22</td>
<td>TIME</td>
</tr>
<tr>
<td>7</td>
<td>Volume Time</td>
<td>V</td>
<td>1—22</td>
<td>TIME</td>
</tr>
<tr>
<td>8</td>
<td>Originating Organization</td>
<td>V</td>
<td>1—80</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Label</td>
<td>V</td>
<td>1—80</td>
<td></td>
</tr>
</tbody>
</table>

**Notes for fields:**

1. Standard blockette type identification number.
2. Length of the entire blockette, including the 7 bytes in fields 1 and 2.
3. Version number of the format, currently "V2.3."
4. Logical record length, expressed as a power of 2. A 4096 byte logical record would have "12" in this field. Logical record lengths can be from 256 bytes to 32,768 bytes. 4096 bytes is preferred.
5. The earliest time seen in the time span list for this logical volume.
6. The latest time on the logical volume.
7. The actual date and time that the volume was written.
8. The organization writing the SEED volume.
9. An optional label that can be used to identify this SEED volume. For instance a label...
Data Records

(1) Separated header file and data
Data records
(2) decoded in base64

<data_records>
<data_record sequence_number="000001">
<data_header>
    header information
</data_header>
<chunk data_record_length="4048">
6AMAAoBDAAAAAAAAAAAAAAKpqqr
cgAIAREAXQBM/8H/FP/GALoAlxqpaqon
</chunk>
</data_record>
</data_records>
XML-SEED formatted data are now provided through Pacific21 Data Center

- [http://www.jamstec.go.jp/pacific21/xmlninja](http://www.jamstec.go.jp/pacific21/xmlninja)
- Seismograms are formatted either in format1 (binary mini-seed) or format2 (base64 encoded mini-seed)
- Software to convert full-SEED volume to XML-SEED and to read XML-SEED volume are also provided through the Pacific21 Data Center
On this page, XML-SEED formatted data and the tools related with XML-SEED are provided. Please take notice that the data and the tools are experimental.

It is necessary to agree to the license to use the data and the tools.

Download XML-SEED Data

Download XML-SEED Tools
xrdseed

- Reads XML-SEED volumes and output header information and seismograms.
- Based on rdseed
- Runs on Solaris8/SPARC platform.
Google Earth as geophysical data viewer
• Realtime data exchange
  We will have a symposium on Mar. 22-23 on data exchange in Yokohama, Japan.
• Network Data Center system by using web services
• XML SEED for broadband seismograms
  http://www.jamstec.go.jp/pacific21/xmlninja
• XML SEED for synthetic seismograms
  http://www.jamstec.go.jp/pacific21/ninja_synth