New Server Concept at the BKG Data Center

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Introduction

- Motivation for development of new concept
- Concept background (basic ideas)
- Demonstration (offline)
- Outlook
Current Drawback

- Only 1 to 2 staff members could maintain the data center (poor personal backup)
- Too many exceptions contrary to the general procedure
  - Programs became unclear
  - Debugging is difficult
- Quick information about active processes and missing data is sparsely possible
  - It takes too much time to detect any inconsistencies in the data transfer and errors of the running processes
- Current structure is designed for usage of ftp in batch-mode
  - Today’s users ask additionally for interactive search and download
  - A presentation of the data center on the web is mandatory
- GSAC wholesaler software is currently not included
Why New Concept?

- Access should be more comfortable for users and administrators
- Quick orientation for users desirable
- Clear structure is helpful for maintenance
- Better visibility of current content of the data center desirable
- Easy repair and fallback possibility necessary
- GSAC Wholesaler kid is based on perl modules and perl should be used more generally
Why LAMP Server Concept?

- Decision in favour to use LAMP
- LAMP abbreviation used for
  - Linux operating system
  - Apache web server
  - MySQL data base
  - PHP script language
- http protocol for users and maintenance
  - Easy to use
  - Access is possible from everywhere
  - We could share the daily maintenance between various staff members (short time to learn the administration)
- Standard hardware configuration (PC and RAID disk system)
- „open source“ software
- Usage of a relational data base
  - A relational data base is well suitable for all bookkeeping tasks
  - It provides the input for dynamical web-pages
- PHP could easily be used to generate web-pages from data base requests
Restrictions for the new concept

- File system remains unchanged
- Anonymous ftp continuously possible
- Guidelines of various services/projects must be accounted for
  - E.g., BKG is Regional IGS DC, EUREF DC, and National DC
  - Each project has its own guidelines.
    - Project specific directories
Basic Structure

- **System programs**
  - Watcher (looking for new incoming files)
  - ftp processes
    - Move files from incoming directory to working directory
  - GSAC daemon
  - Maintenance daemon (cleaning temporary directories)

- **File processing**
  - RINEX daemon
  - Mirror program

- **Administration**
  - Alert management (error console)
  - Enhanced automation (start new processes with http)
  - Monitoring
    - Show and handle processes
  - Simple configuration of tasks (e.g. daily download of station log files)
  - Storage of meta data in data base
Detailed Structure

- ftp event daemon
  - Wait for finish of file transfer before processing
- Synchronization of configuration file of ftp und http user
- File locking applied to allow parallel processing
- New check import design
- Parse file headers according to the station log files
- Search feature
- Download feature
Welcome to the GPS / GLONASS Data Center

The Federal Agency for Cartography and Geodesy (BKG) in Frankfurt/Main, Germany operates a regional GPS/GLONASS data center. Observation data and analysis results from permanent GPS and GLONASS receivers are available through this server.

The data center has an official function in the frameworks of the International GPS Service (IGS), the International GLONASS Service Pilot Project (IGLPS), the IAG Sub-Commission X for Europe (CURE), and the German Geodetic GPS Reference Network (GREF).

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Tel: +49-69 6333-1 | Fax: +49-69 6333-235 | Email: bgf.mailbox@bgf.de
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Checkimport – by Files
Date Converter
Checkimport – Color Index

Legend:
- < 6 hours
- < 12 hours
- < 24 hours
- < 2 days
- < 4 days
- > 4 days
- never

Last update: 10th February 2004 at 09:20 (Day 41)

Click on station code: Show observation files for all filetypes of this station.
Click on colorpad: Show observation file details.
Click on date: Show all observation files for the selected date (also hourly observation files).
Checkimport – File Details
Checkimport – by Hourly File

Last update: 10th February 2004 at 09:20 (Day 41)

Legend:
- < 0 minutes
- < 15 minutes
- < 30 minutes
- < 1 hour
- < 4 hours
- > 4 hours
- never

Click on station code. Show observation files for all filetypes of this station.
Click on colorpad. Show observation file details.
Checkimport – by Station
Stations - Overview
### Stations - Search

![Stations Search Interface]

**Overview: Stations**

<table>
<thead>
<tr>
<th>Station</th>
<th>Site Name</th>
<th>City</th>
<th>Country</th>
<th>E-Mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGS S3</td>
<td>Barcelona</td>
<td>Spain</td>
<td>Email 1</td>
<td></td>
</tr>
<tr>
<td>IGS S4</td>
<td>Paris</td>
<td>France</td>
<td>Email 2</td>
<td></td>
</tr>
</tbody>
</table>

**Check Import**
- By file
- By hourly file
- By station

**Data Center**
- Search
- Download
- FMT
- PDS
- Site

**Data Maintenance**
- Editor Console
- Logging
- Mimiros
- Rule Set
- Special Folders
- Consistency Check

**System Maintenance**
- System View
- History
- Permissions
- Project Options
Stations – Edit cont.
Stations – Edit Receiver

[Image of a computer screen showing a software interface for editing receiver information.]
Stations – Edit cont. (2)
Stations – Edit Antenna
Stations – Edit cont. (3)
Data – Search
### Data – Search Results

Search Results: 301 files found
Showing files 1 – 30

<table>
<thead>
<tr>
<th>#</th>
<th>TYPE</th>
<th>NAME</th>
<th>SIZE</th>
<th>MEASURE DATE</th>
<th>STATION</th>
<th>PATH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>W177033X_0HD.Z</td>
<td>23.3 kb</td>
<td>01.02.2004 / 32 A</td>
<td>W177</td>
<td>EUREF/0031/23/</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>W177033X_0HD.Z</td>
<td>256 byte</td>
<td>01.02.2004 / 32 A</td>
<td>W177</td>
<td>EUREF/0031/23/</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>W177033X_0HD.Z</td>
<td>23.3 kb</td>
<td>01.02.2004 / 32 B</td>
<td>W177</td>
<td>EUREF/0031/23/</td>
</tr>
<tr>
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<td>01.02.2004 / 32 B</td>
<td>W177</td>
<td>EUREF/0031/23/</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>W177033X_0HD.Z</td>
<td>19.6 kb</td>
<td>01.02.2004 / 32 C</td>
<td>W177</td>
<td>EUREF/0031/23/</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>W177033X_0HD.Z</td>
<td>19.6 kb</td>
<td>01.02.2004 / 32 D</td>
<td>W177</td>
<td>EUREF/0031/23/</td>
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<td>7</td>
<td></td>
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<tr>
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<td></td>
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<td>18.5 kb</td>
<td>01.02.2004 / 32 F</td>
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<td>EUREF/0031/23/</td>
</tr>
<tr>
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<td></td>
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<td>01.02.2004 / 32 J</td>
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</tr>
<tr>
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<td></td>
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</tr>
<tr>
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<td>256 byte</td>
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<td>W177</td>
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</tr>
<tr>
<td>15</td>
<td></td>
<td>W177033X_0HD.Z</td>
<td>256 byte</td>
<td>01.02.2004 / 32 M</td>
<td>W177</td>
<td>EUREF/0031/23/</td>
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<tr>
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</tr>
<tr>
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<td>W177</td>
<td>EUREF/0031/23/</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>W177033X_0HD.Z</td>
<td>256 byte</td>
<td>01.02.2004 / 32 P</td>
<td>W177</td>
<td>EUREF/0031/23/</td>
</tr>
<tr>
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<td></td>
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<td>256 byte</td>
<td>01.02.2004 / 32 Q</td>
<td>W177</td>
<td>EUREF/0031/23/</td>
</tr>
</tbody>
</table>

*Note: The table continues with similar entries.*
Data - Download
### Data – Search Results (2)

#### Search Results: 301 files found

<table>
<thead>
<tr>
<th>#</th>
<th>TYPE</th>
<th>NAME</th>
<th>SIZE</th>
<th>MEASURE DATE</th>
<th>STATION</th>
<th>PATH</th>
</tr>
</thead>
<tbody>
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<td>98</td>
<td>WTIZ01X.BHD.Z</td>
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<tr>
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<td>98</td>
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<td>23.3</td>
<td>01.02.2004</td>
<td>WIQTZ</td>
<td>EUREF:\m4031\13/</td>
</tr>
<tr>
<td>3</td>
<td>98</td>
<td>WTIZ01A.BHD.Z</td>
<td>23.3</td>
<td>01.02.2004</td>
<td>WIQTZ</td>
<td>EUREF:\m4031\13/</td>
</tr>
<tr>
<td>4</td>
<td>98</td>
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<td>WIQTZ</td>
<td>EUREF:\m4031\13/</td>
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<td>23.3</td>
<td>01.02.2004</td>
<td>WIQTZ</td>
<td>EUREF:\m4031\13/</td>
</tr>
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<td>98</td>
<td>WTIZ01B.BHD.G</td>
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<td>WTIZ01B.BHD.S</td>
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<td>23.3</td>
<td>01.02.2004</td>
<td>WIQTZ</td>
<td>EUREF:\m4031\13/</td>
</tr>
</tbody>
</table>

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**Note:** The table above displays the search results for 301 files found, showing files 1 to 30. Each row contains information about the file type, name, size, measurement date, station, and path.
Data - Filebrowser
### Error Console

#### Error Console Interface

- **Station**: Various stations listed.
- **Date**: Dates of occurrence.
- **Last message**: Messages associated with each station.
- **Level**: Severity of messages.

**Status Indicators**
- **Error**
- **Fatal**

---

3/23/2004  
IGS Workshop, Berne, March 1 - 5, 2004
## Mirrors

### Overview: Mirrors

<table>
<thead>
<tr>
<th>Edit</th>
<th>Mirror ID</th>
<th>Mirror Name</th>
<th>Remote Address</th>
<th>File Type</th>
<th>Remote Directory</th>
<th>Delete Local</th>
<th>Start Time</th>
<th>Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>NASA FTP Mirror</td>
<td>nasa.jpl.nasa.gov</td>
<td>mail</td>
<td>false</td>
<td>true</td>
<td>2003-11-29 01:00:00 Delete</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>NASA FTP Mirror</td>
<td>nasa.jpl.nasa.gov</td>
<td>mail</td>
<td>false</td>
<td>true</td>
<td>2003-11-29 01:00:00 Delete</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>NASA FTP Mirror</td>
<td>nasa.jpl.nasa.gov</td>
<td>mail</td>
<td>false</td>
<td>true</td>
<td>2003-11-29 01:00:00 Delete</td>
<td></td>
</tr>
</tbody>
</table>

**New entry**

<table>
<thead>
<tr>
<th>Edit</th>
<th>Mirror ID</th>
<th>Mirror Name</th>
<th>Remote Address</th>
<th>File Type</th>
<th>Remote Directory</th>
<th>Delete Local</th>
<th>Start Time</th>
<th>Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>16</td>
<td>EUREFStation</td>
<td>europe.oma.be</td>
<td>log</td>
<td>false</td>
<td>true</td>
<td>2004-01-09 15:37:00 Delete</td>
<td></td>
</tr>
</tbody>
</table>

*powered by eQuinix*
Consistency Check
System View
System History
Internet Connectivity
### Processes

#### Table

<table>
<thead>
<tr>
<th>Process Name</th>
<th>System PID</th>
<th>Type</th>
<th>Station</th>
<th>Job Status</th>
<th>OS Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL Watcher</td>
<td>1418</td>
<td>DAEMON</td>
<td>n/a</td>
<td>Sleeping 10</td>
<td>LogFile</td>
</tr>
<tr>
<td>EUREF Watcher</td>
<td>1403</td>
<td>DAEMON</td>
<td>n/a</td>
<td>Sleeping 10</td>
<td>LogFile</td>
</tr>
<tr>
<td>EUREF Process</td>
<td>22637</td>
<td>DAEMON</td>
<td>n/a</td>
<td>Started</td>
<td>LogFile</td>
</tr>
<tr>
<td>FTP Process</td>
<td>1730</td>
<td>DAEMON</td>
<td>n/a</td>
<td>Sleeping 10</td>
<td>LogFile</td>
</tr>
<tr>
<td>GRET Watcher</td>
<td>1409</td>
<td>DAEMON</td>
<td>n/a</td>
<td>Sleeping 10</td>
<td>LogFile</td>
</tr>
<tr>
<td>GRET Process</td>
<td>31882</td>
<td>DAEMON</td>
<td>n/a</td>
<td>Waiting</td>
<td>LogFile</td>
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<tr>
<td>IODS Watcher</td>
<td>1413</td>
<td>DAEMON</td>
<td>n/a</td>
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</tr>
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<td>IODS Process</td>
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<td>Started</td>
<td>LogFile</td>
</tr>
<tr>
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</tr>
<tr>
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<td>DAEMON</td>
<td>n/a</td>
<td>Started</td>
<td>LogFile</td>
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<td>2499</td>
<td>DAEMON</td>
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<tr>
<td>Job Process</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>GRET Process</td>
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<tr>
<td>IODS Process</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Status Indicators**
- Running
- Stalled, will be terminated
- Terminating

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3/23/2004

IGS Workshop, Berne, March 1 - 5, 2004
GSAC Wholesaler Administration

![Screenshot of GSAC Wholesaler Administration interface]

**WAdmin Tool**

This program serves as a command-line administration tool for GSAC Wholesaler. Basic functions like investigation and separation of list file holdings are provided by this executable.

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>clean</th>
</tr>
</thead>
</table>

**OPTIONS**

- **TYPES:** [please choose]
- **AREAS:** [please choose]

- define current year (4-digit year)
- define current day (3-digit day of year)
- select non-usable site [site id]
- span of days (integer value, e.g. 14 for fourteen days)
- verbose mode
- just print version of this executable

**GSAC Catalog Administration**

Here you can create the permanent catalog (PC).

Here you can create the complete data holding files (DHF) - needs very long... [Help [more...]]

Start this process!
Demonstration

- Link to the new server during test phase
  - Users: http://igs2.ifag.de
  - Administrator: http://igs2.ifag.de/index_admin.php
Real Time Data Streams

- The current data center web page includes
  - Information about available real time stations
  - Download of software to be used to receive real time data streams
- Data streams of stations of interest are accumulated to hourly files and transferred to the data archive
Software Download for Real Time Data

NTRIP
Networked Transport of RTCM via Internet Protocol

Downloads
The latest version of the Ntra documentation and an Ntra presentation as well as the programs which are part of the example implementation are available from the table below:

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Access to Real Time Data Streams

The Broadcaster is operated to distribute data streams from EUREF’s EPN as well as data from other resources (see Distribution Maps and Stream List). It currently disseminates data from the following networks:

- EUREF - European Permanent Network, Europe
- GREF - German Geodetic Reference Network, Germany
- IGS - International GPS Service
- SFOS-ILN - Satellite Positioning Service, Berlin, Germany
- SFOS-BPA - Satellite Positioning Service, Brandenburg, Germany
- SFOS-MAn - Satellite Positioning Service, Mecklenburg-Vorpommern, Germany
- SFOS-SAR - Satellite Positioning Service, Saarland, Germany
- SFOS-Thr - Satellite Positioning Service, Thuringia, Germany
- SDON-OCRT - Orange County Real Time Network, CA, USA
- CORB - Continuously Operating Reference Stations, USA
- EPNOS - European Permanent Network, Europe
- EGNOS - European Geostationary Navigation Overlay Service, Europe
- WAAS - Wide Area Augmentation System, USA
- OmniSTAR - OmniSTAR Service, Europe (Test & Evaluation)
- MISC - Miscellaneous Stations

Accessing the EUREF IP帮扶 Broadcaster

The EUREF IP帮扶 Broadcaster's current IP address and port is

```
129.217.192.218
```

Note that when using services of a Mobile Internet Service Provider (MISP), it might be necessary to receive data through port 2191 instead of 80. Thus, in case of problems with a Mobile ISP you may like to try

```
129.217.192.218:2191
```

For receiving data streams in real time you may use the GNSS Internet Radio. This is an NTRIP client program designed to run on a PC or Laptop. It can receive data from any NTRIP supporting Broadcaster. The program handles all HTTP communication and transfers the received GNSS data to a serial or IP port feeding networking software or a DOPPLRTK application. Most of the data streams on the Broadcaster are protected. Authorization details are provided through user maintenance forms as maintained under the responsibility of the network owners.
Conclusion

- The new server realization shows up in a modern and user friendly design
- It contributes to a better visibility of IGS products
- We will run both (the old and the new) servers parallel until the functionality and robustness of the new concept will be confirmed

- Notice:
  - BKG switched to 34 Mbit/sec Internet connection on February 23, 2004