Quotation from Ken MacLeod
NRCan, May 4, 2006

„I think we should consider all the options,
as you mentioned.“

„I doubt that we can have a one size fits all solution....“

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Streaming Real-Time IGS Data and Products Using NTRIP

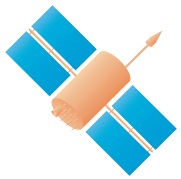
Georg Weber

Federal Agency for Cartography and Geodesy (BKG)

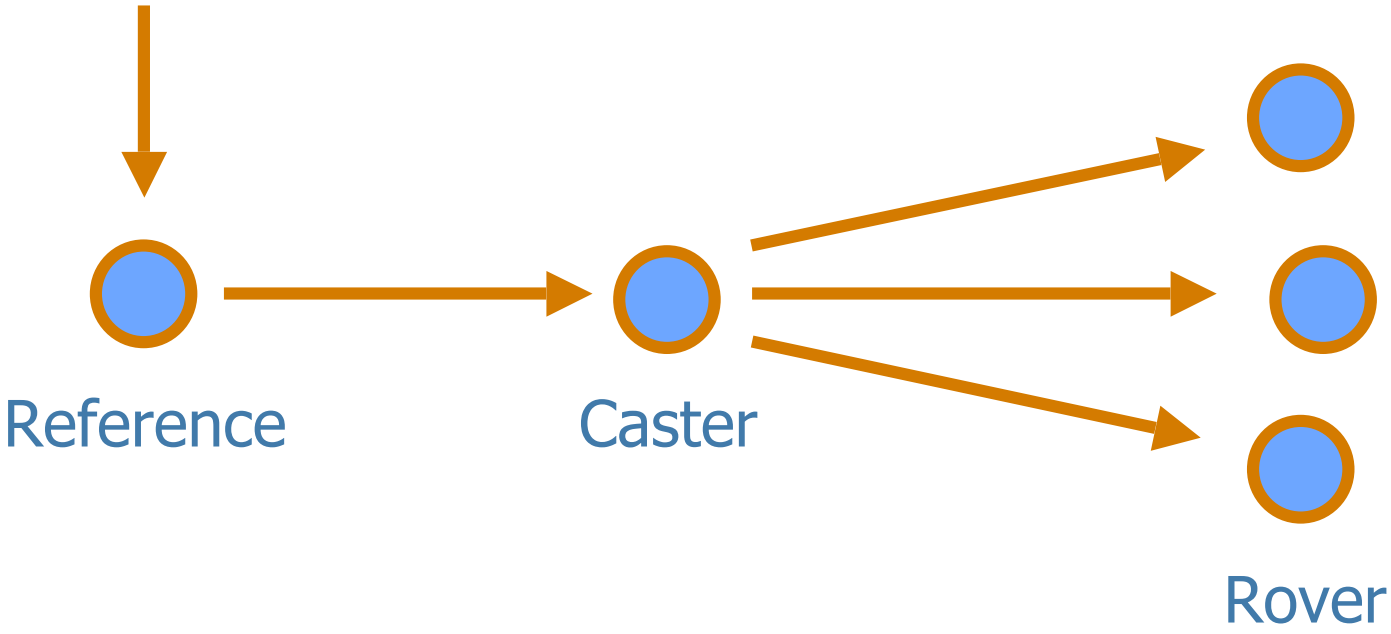
Frankfurt, Germany

IGS Workshop, Mai 08-11, 2005, Darmstadt, Germany

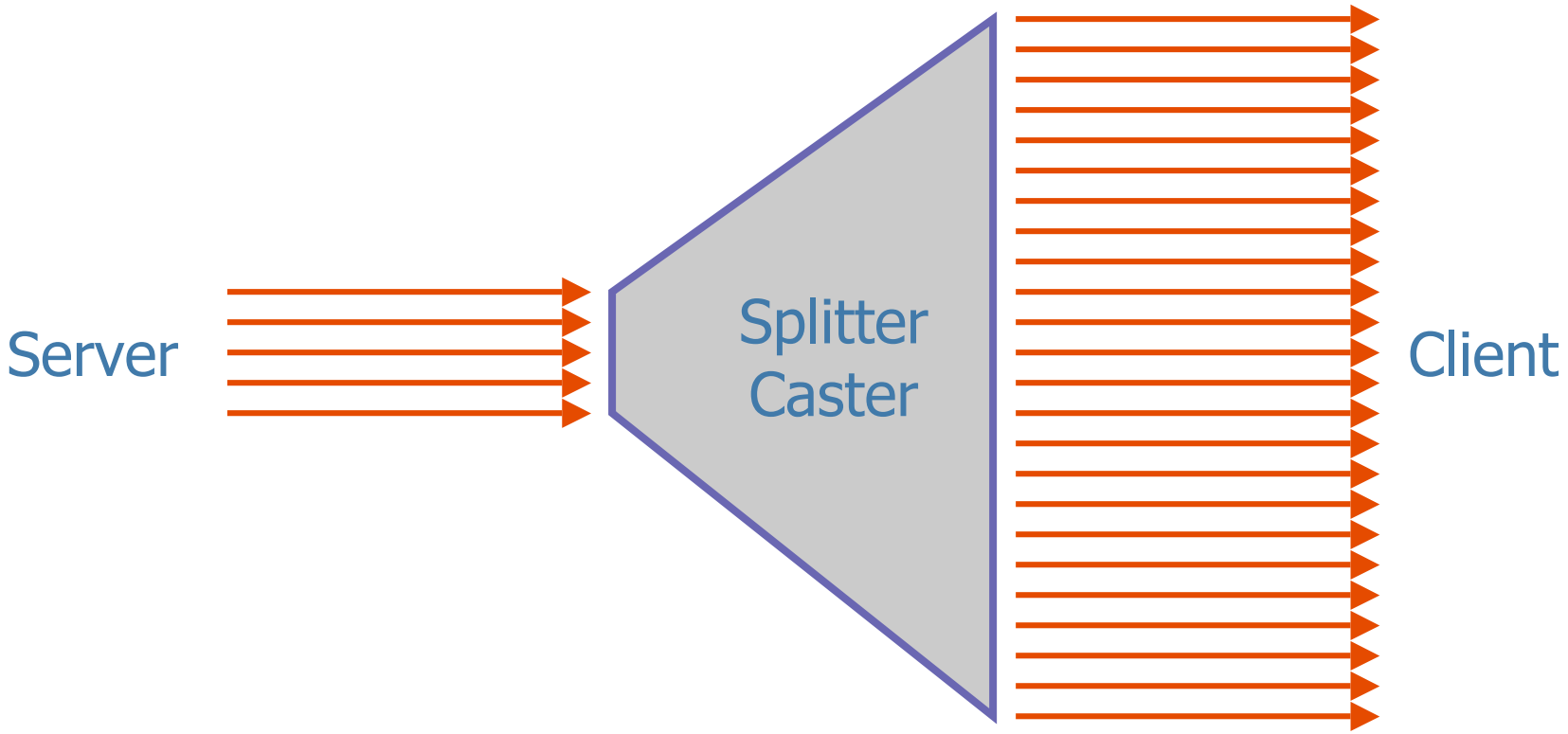
Networked Transport of RTCM via Internet Protocol (Ntrip)



- Based on HTTP
- Handles Metadata



GNSS Internet Radio / IP-Streaming



~5 kbit/s per GNSS Stream max.

Meta-data


Source Table
Previous
Next
Select
Cancel
Broadcaster: EUREF-IP operated by BKG in DEU
Won't handle incoming NMEA-GGA
http://www.euref-ip.net/home
Stream: Erlanger, Entry No: 119 of 147
Mountpoint: ERLA0
Authentication: Basic
Format: RTCM 2.2
Format-Details: 3(60),18(1),19(1),22(60)
Carrier: L1 and L2
Client must send NMEA-GGA: No
System: GPS
Country: USA
Latitude: 39.01 deg North
Longitude: 275.24 deg East
Generator: Ashtech Z-XII3
Solution: Single Base
Compression: none
Bitrate: 3000 bits per sec
Miscellaneous: http://ncad.net
Network: CORS
Operator: NGS
Details: http://www.ngs.noaa.gov/CORS
Registration: http://igs.ifag.de/index_ntrip_reg.htm
Charges: No

Ntrip - Characteristics

- Http: Easy to implement, usually not blocked by firewalls
- Distribution of any kind of GNSS data
- Mass usage: Disseminating hundreds of streams simultaneously for a few thousand users when applying modified Internet Radio broadcasting software
- Security: Stream providers and users not in contact
- Streaming over any (mobile) IP network

September 2004
Ntrip Vers. 1.0 becomes RTCM Standard

Selection of devices supporting Ntrip

Ntrip Version 2.0

- Full HTTP compatibility (proxy server)
- UDP Unicast Transport for Client-Caster communication
  - Real-Time Streaming Protocol (RTSP) on top of TCP for stream control
  - Real-Time Transport Protocol (RTP) on top of UDP for data transport

Data Format & Transport Protocol

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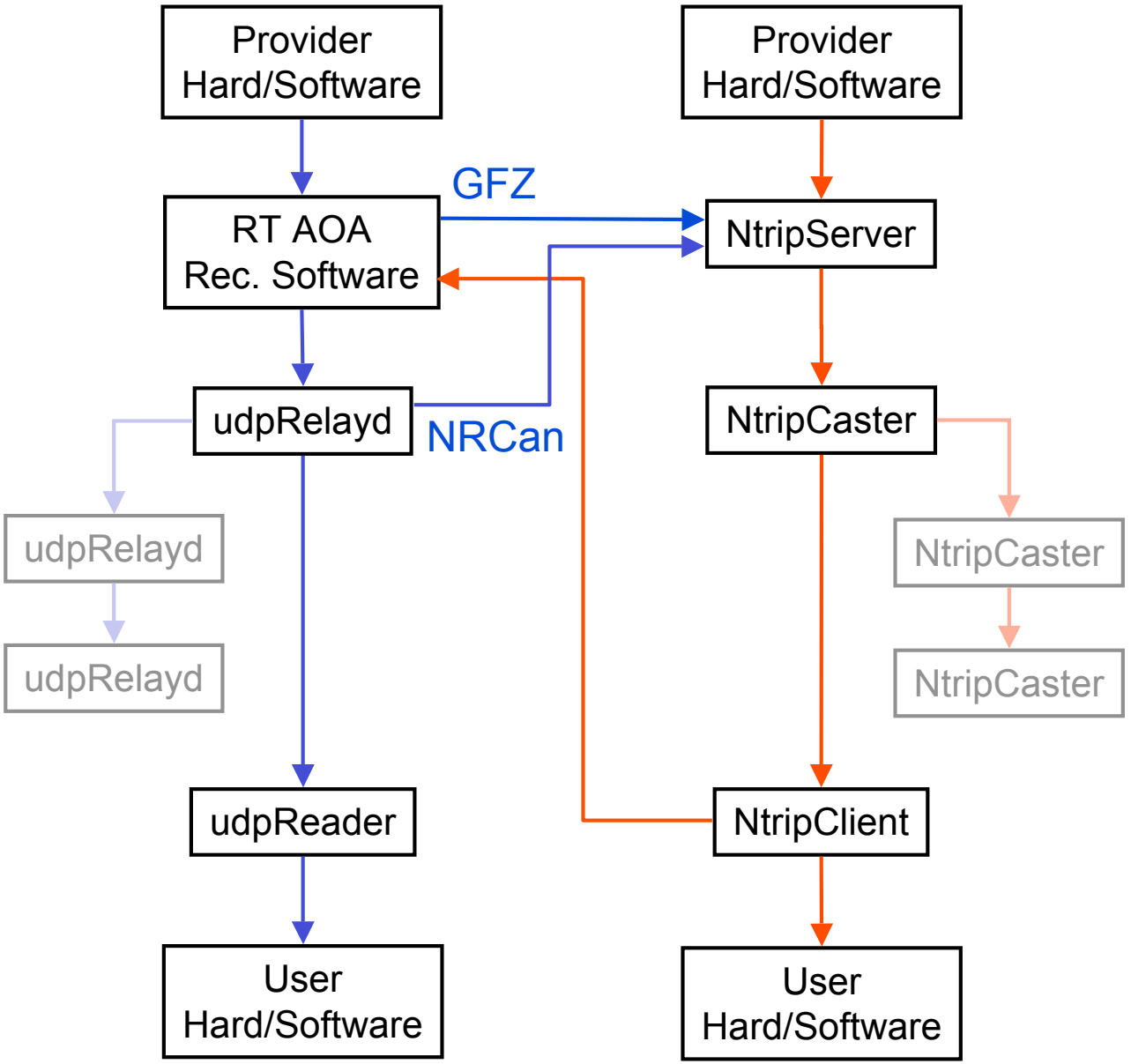
RTIGS-NTRIP

Interface



RTIGS Pilot Project - Policy

- Open data policy
- Not handling classified data
- Priority for analysis centers if and when necessary

Reference Station
Upgrade Recommendation

- Upgrade all reference stations to real-time
- Support formats accepted by clients
- Generate high-rate data streams
- Upload streams to (next) Ntrip Broadcaster
- Monitor stream flow and content
- Assist existing real-time services
- Participate in global stream exchange

Real-Time GNSS Product Areas

- Satellite Orbits, Clocks
- Troposphere
- Ionosphere
- Space-Weather
- Satellite Health
- Interference
- Natural Hazards
- Ephemerides, A-GPS
- DGPS/RTK
- StateSpace ⇒ ObservationSpace Conversion
- Combining individual AC Products
- Hourly Coordinates, Notification Service

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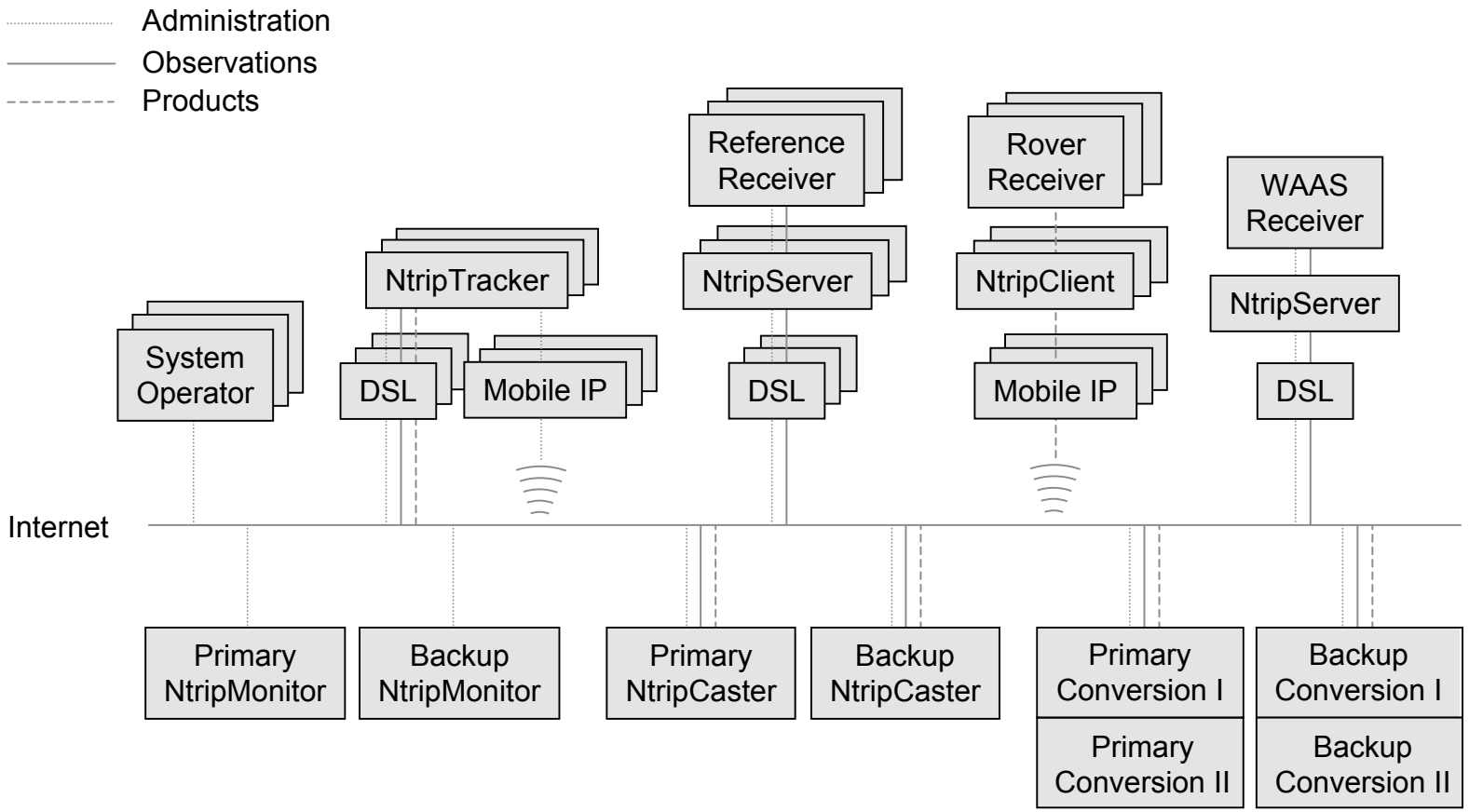
RTIGS Internet Broadcast Service Concept



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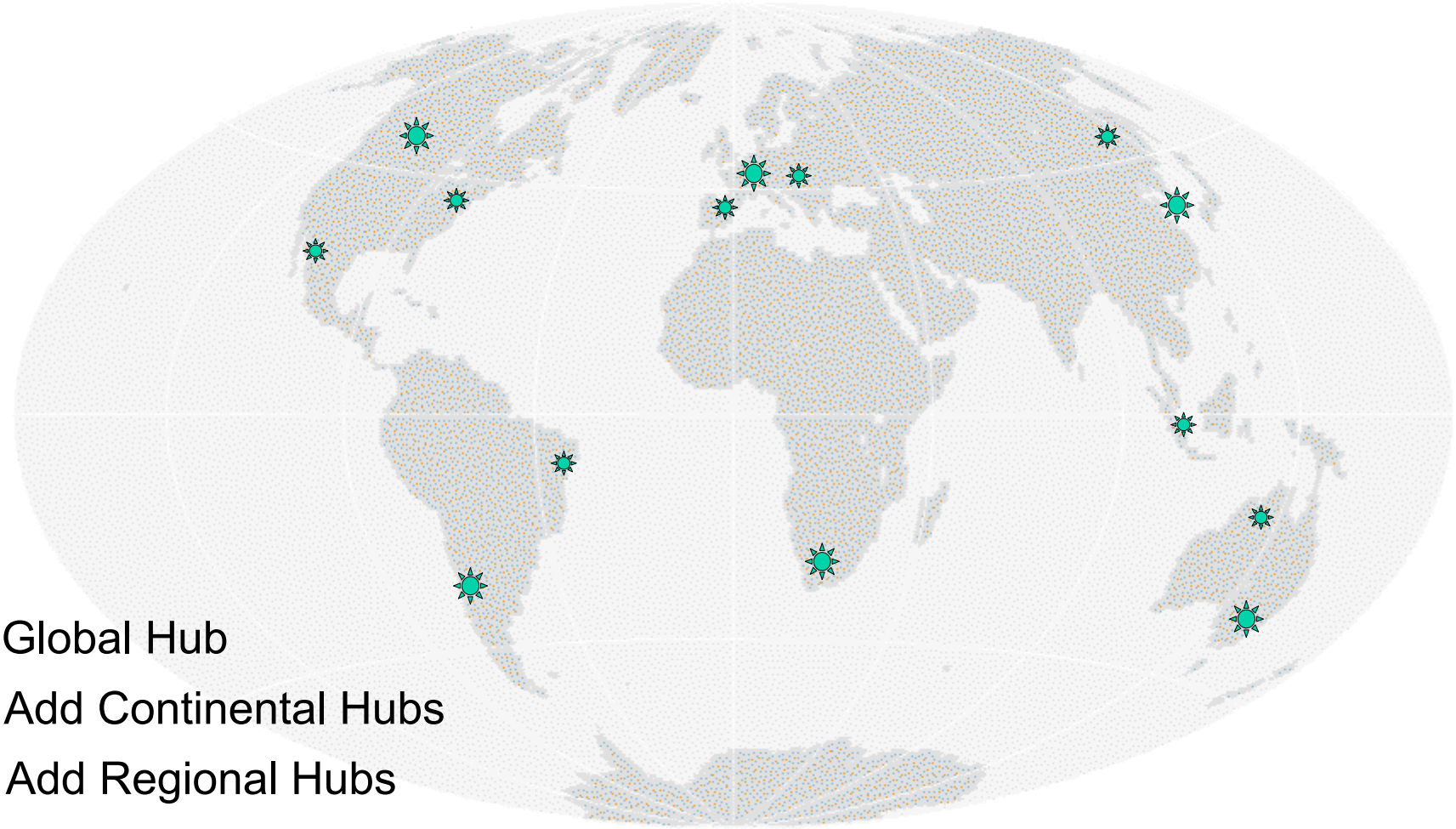
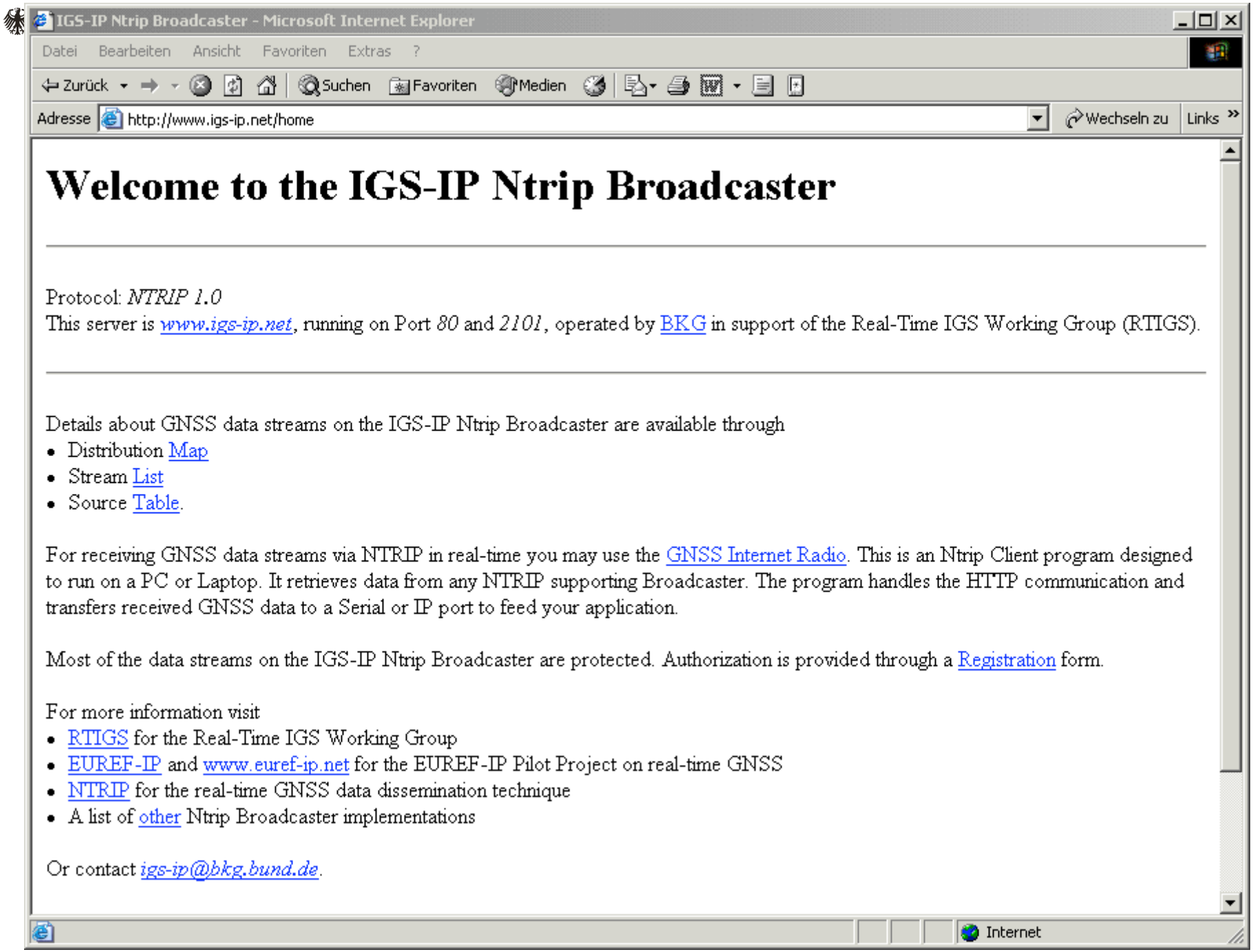
RTIGS - Sharing Broadcast Workload

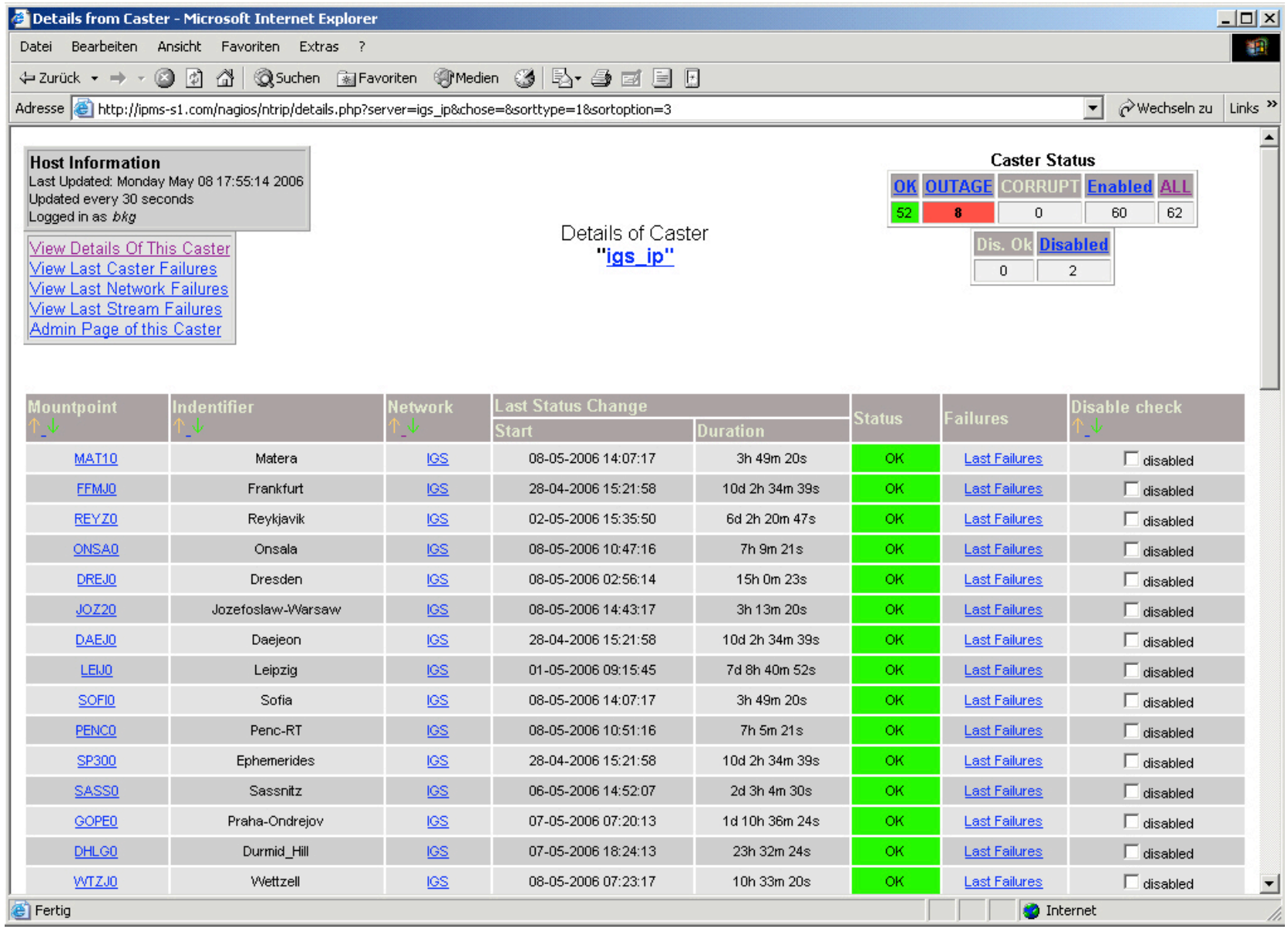


Global Hub

Add Continental Hubs

Add Regional Hubs


IGS-IP Ntrip Broadcaster - Microsoft Internet Explorer
Datei Bearbeiten Ansicht Favoriten Extras ?
Zurück Suchen Favoriten Medien
Adresse http://www.igs-ip.net/home
Wechseln zu Links
Welcome to the IGS-IP Ntrip Broadcaster
Protocol: NTRIP 1.0
This server is www.igs-ip.net, running on Port 80 and 2101, operated by BKG in support of the Real-Time IGS Working Group (RTIGS).
Details about GNSS data streams on the IGS-IP Ntrip Broadcaster are available through
Distribution Map
Stream List
Source Table.
For receiving GNSS data streams via NTRIP 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 retrieves data from any NTRIP supporting Broadcaster. The program handles the HTTP communication and transfers received GNSS data to a Serial or IP port to feed your application.
Most of the data streams on the IGS-IP Ntrip Broadcaster are protected. Authorization is provided through a Registration form.
For more information visit
RTIGS for the Real-Time IGS Working Group
EUREF-IP and www.euref-ip.net for the EUREF-IP Pilot Project on real-time GNSS
NTRIP for the real-time GNSS data dissemination technique
A list of other Ntrip Broadcaster implementations
Or contact igs-ip@bkg.bund.de.
Internet



Details from Caster - Microsoft Internet Explorer

Datei Bearbeiten Ansicht Favoriten Extras ?

Zurück Suchen Favoriten Medien

Adresse http://ipms-s1.com/nagios/ntrip/details.php?server=igs_ip&chose=&sorttype=1&sortoption=3

Wechseln zu Links

Host Information
Last Updated: Monday May 08 17:55:14 2006
Updated every 30 seconds
Logged in as *bkg*

View Details Of This Caster
View Last Caster Failures
View Last Network Failures
View Last Stream Failures
Admin Page of this Caster

Details of Caster
"igs_ip"

Caster Status

OK	OUTAGE	CORRUPT	Enabled	ALL
52	8	0	60	62

Dis. Ok	Disabled
0	2

Mountpoint	Indentifier	Network	Last Status Change		Status	Failures	Disable check
			Start	Duration			
MAT10	Matera	IGS	08-05-2006 14:07:17	3h 49m 20s	OK	Last Failures	disabled
FFMJ0	Frankfurt	IGS	28-04-2006 15:21:58	10d 2h 34m 39s	OK	Last Failures	disabled
REYZ0	Reykjavik	IGS	02-05-2006 15:35:50	6d 2h 20m 47s	OK	Last Failures	disabled
ONSA0	Onsala	IGS	08-05-2006 10:47:16	7h 9m 21s	OK	Last Failures	disabled
DREJ0	Dresden	IGS	08-05-2006 02:56:14	15h 0m 23s	OK	Last Failures	disabled
JOZ20	Jozefoslaw-Warsaw	IGS	08-05-2006 14:43:17	3h 13m 20s	OK	Last Failures	disabled
DAEJ0	Daejeon	IGS	28-04-2006 15:21:58	10d 2h 34m 39s	OK	Last Failures	disabled
LEIJ0	Leipzig	IGS	01-05-2006 09:15:45	7d 8h 40m 52s	OK	Last Failures	disabled
SOFI0	Sofia	IGS	08-05-2006 14:07:17	3h 49m 20s	OK	Last Failures	disabled
PENC0	Penc-RT	IGS	08-05-2006 10:51:16	7h 5m 21s	OK	Last Failures	disabled
SP300	Ephemerides	IGS	28-04-2006 15:21:58	10d 2h 34m 39s	OK	Last Failures	disabled
SASS0	Sassnitz	IGS	06-05-2006 14:52:07	2d 3h 4m 30s	OK	Last Failures	disabled
GOPE0	Praha-Ondrejov	IGS	07-05-2006 07:20:13	1d 10h 36m 24s	OK	Last Failures	disabled
DHLG0	Durmid_Hill	IGS	07-05-2006 18:24:13	23h 32m 24s	OK	Last Failures	disabled
WTZJ0	Wettzell	IGS	08-05-2006 07:23:17	10h 33m 20s	OK	Last Failures	disabled

Fertig Internet

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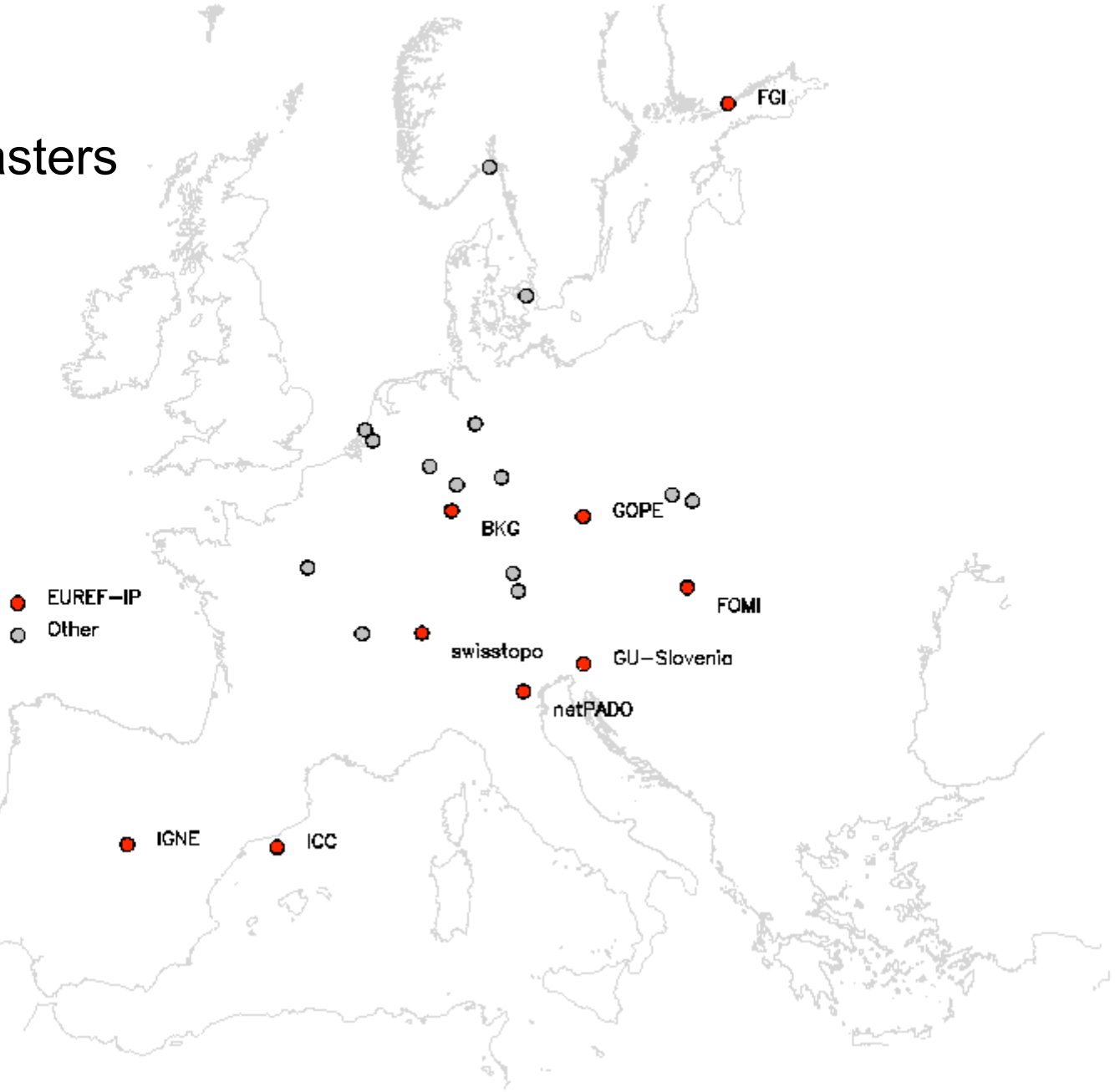
Ntrip Broadcasters Europe



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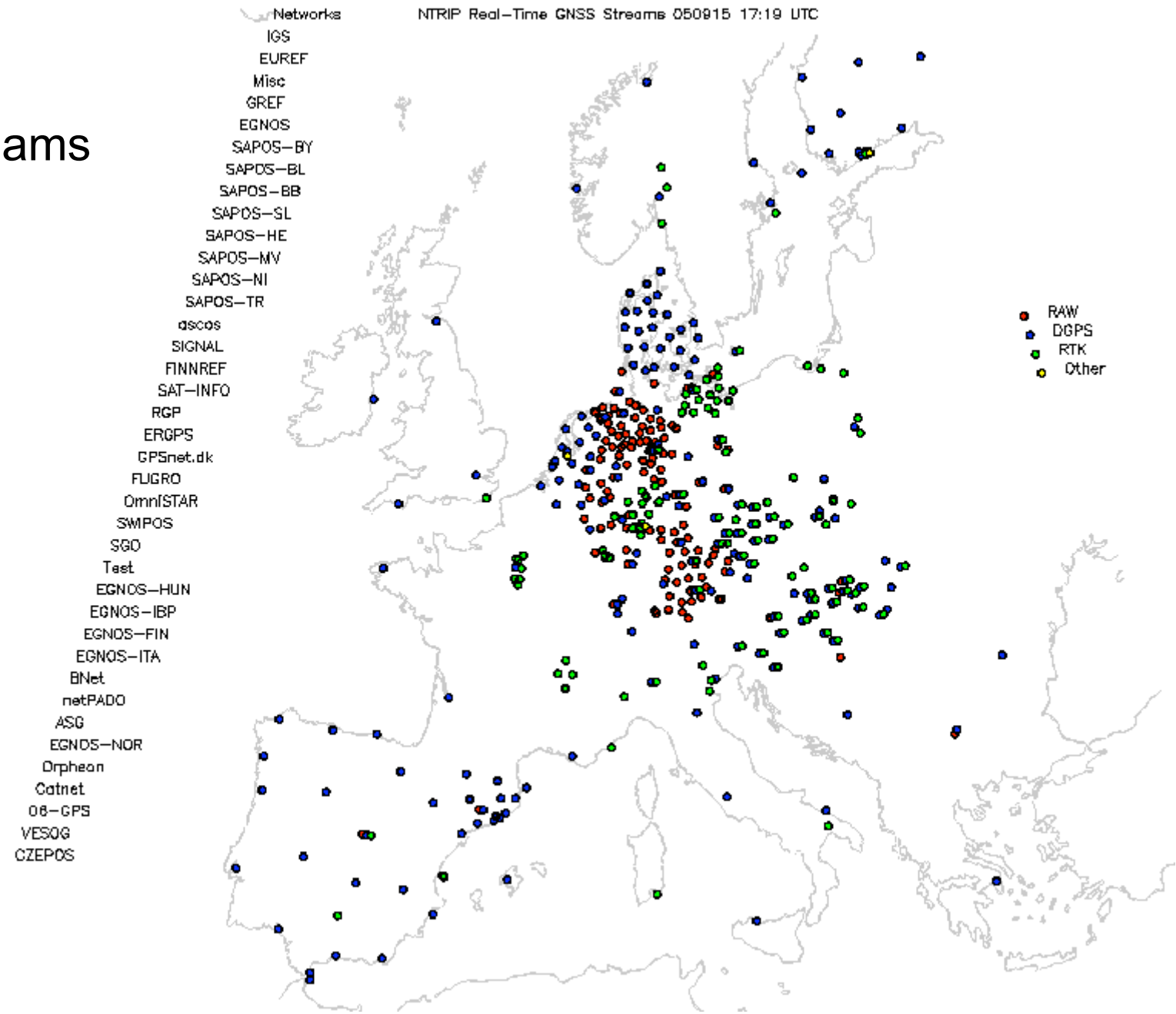
Ntrip Streams Europe



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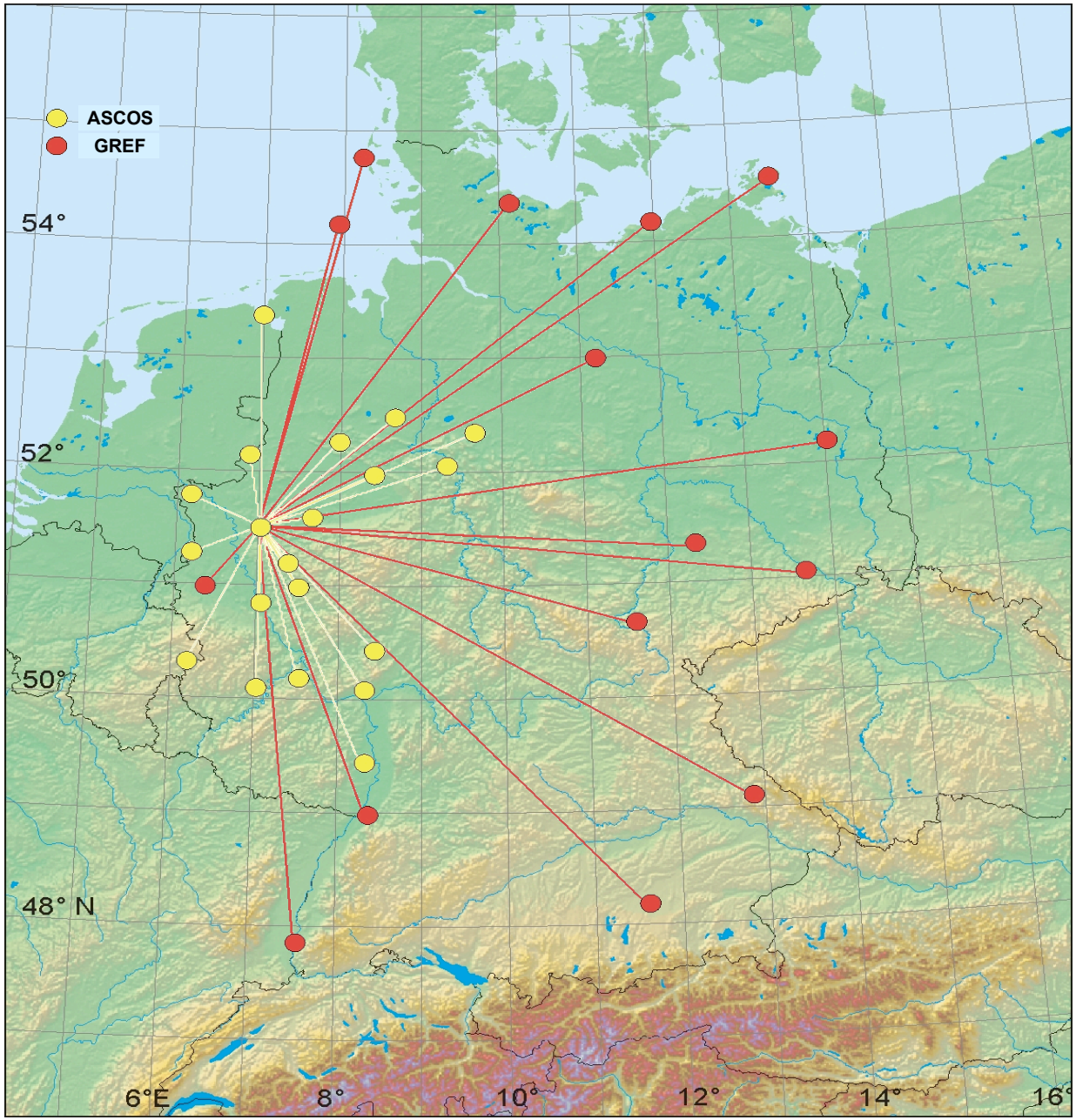
Post-Processing

Real-Time

Aligning local
RTK service
to ITRF
in real-time



Ntrip Tools

Ntrip Client

- Windows: GNSS Internet Radio
- Windows: CE & PocketPC 2003: GNSS Internet Radio
- Linux: Plain Example Program, GNU GPL
- Linux: Perl NtripClient, GNU GPL
- Palm OS: Demo Example Program

Ntrip Server

- Windows: Reading from Serial Port
- Windows: Command line version, reading from IP address/port
- Linux: Reading SISNeT, TCP/UDP Port, Serial Port, NtripCaster, GNU GPL
- Linux: Perl NtripServer, Reading from Standard Input, GNU GPL

Ntrip Decoder, Converter, etc

- Windows: GnssSurfer, Client & Server & RTCM 2.x Decoder, GNU GPL
- Windows: RTCM 2.x DGPS/RTK Decoder, reading from TCP/IP Port
- Linux: Stand-alone RTCM 2.x RTK Decoder, reading from Std. Input, GNU GPL
- Linux: Multi-Stream Client and RTCM 2.x to RINEX Converter, GNU GPL
- Linux: Client and RTCM 3 to RINEX Converter, GNU GPL

Plus variety of commercial Ntrip supporting hard and software products

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Sharing Real-Time GNSS Efforts Today

http://www.igs-ip.net/home

igs-ip@bkg.bund.de