

Expanding Federated Data Centers to Asia and the Western Pacific



SAGE EAR-1261681
CoopEUS ICER-1321600



The Current System of Federated Data Centers



15 operational

BGR

ETHZ

GFZ

INGV

IPGP

IRIS DMC/ADC

KANDILLI

LMU

NCEDC

NIEP

NOA

ORFEUS DC

RESIF

SCEDC

USP

&

6 in process

CANADA

KENYA

KYRGYSTAN

MALAWI

UGANDA

ZIMBABWE

Technical Solution Exists

- SeisComp3 was initially developed by Winfried Hanka and the GEOFON project within GFZ, Potsdam
- Now supported by GEMPA, Potsdam, and other groups
- Seiscomp3 releases that support FDSN Web Services
 - Seattle version March 25, 2014
 - Jakarta version November 28, 2016
 - Supported FDSN Web Services
 - Dataselect
 - Station
 - Event
- SeisComp3 is freely available from
 - <https://www.seiscomp3.org>
 - Requires licensing

FDSN Web Services

- URL Builders allow one to understand how to build correctly constructed URLs to invoke services at centers
 - Find out more about constructing URLs that invoke services at
 - <http://service.iris.edu>
 - Select a service such as station
 - Select the URL Builder Tab
 - [DEMO](#)
 - http://service.iris.edu/fdsnws/station/1/query?net=GE&sta=PMG&loc=00&cha=LH?.BH*&starttime=2017-01-01T07:00:00&endtime=2017-05-01T07:00:00&level=station&format=text&includecomments=true&nodata=404
 - http://geofon.gfz-potsdam.de/fdsnws/station/1/query?net=GE&sta=PMG&loc=00&cha=LH?.BH*&starttime=2017-01-01T07:00:00&endtime=2017-05-01T07:00:00&level=station&format=text&includecomments=true&nodata=404

The IRIS Federator:

Data discovery and access across data centers



The IRIS Federator is:

- A composite catalog of time series channels
 - Currently **15** data centers included
- A web service interface for searching the catalog
 - Specifically designed to be used with FDSN-style requests and facilitate **client-side federation**.

Federated Catalog

- <http://service.iris.edu/irisws/fedcatalog>
- <http://service.iris.edu/irisws/fedcatalog/1/query?sta=PMG&loc=00&cha=LHZ,BHZ&starttime=1997-06-07T01:00:00&endtime=2011-06-07T07:00:00&targetservice=station&format=rquest&includeoverlaps=false&nodata=404>

```
DATACENTER=GEOFON,http://geofon.gfz-potsdam.de
STATIONSERVICE=http://geofon.gfz-potsdam.de/fdsnws/station/1/
GE PMG 00 BHZ 1999-05-13T02:50:00 2009-08-09T00:00:00
GE PMG 00 BHZ 2009-08-09T00:00:00 2010-04-16T00:00:00
GE PMG 00 BHZ 2010-04-16T00:00:00 2011-06-07T07:00:00
GE PMG 00 LHZ 1999-05-13T02:50:00 2009-08-09T00:00:00
GE PMG 00 LHZ 2009-08-09T00:00:00 2010-04-16T00:00:00
GE PMG 00 LHZ 2010-04-16T00:00:00 2011-06-07T07:00:00
```

```
DATACENTER=IRISDMC,http://ds.iris.edu
STATIONSERVICE=http://service.iris.edu/fdsnws/station/1/
GE PMG 00 BHZ 1999-05-13T00:00:00 1999-05-13T02:50:00
GE PMG 00 LHZ 1999-05-13T00:00:00 1999-05-13T02:50:00
IU PMG 00 BHZ 1999-05-13T02:50:00 2009-08-09T00:00:00
IU PMG 00 BHZ 2009-08-09T00:00:00 2010-04-16T00:00:00
IU PMG 00 BHZ 2010-04-16T00:00:00 2011-06-07T07:00:00
IU PMG 00 LHZ 1999-05-13T02:50:00 2009-08-09T00:00:00
IU PMG 00 LHZ 2009-08-09T00:00:00 2010-04-16T00:00:00
IU PMG 00 LHZ 2010-04-16T00:00:00 2011-06-07T07:00:00
```

Federated Catalog - Geographic search

URL Builder: fedcatalog v.1

Service interface URL Builder Help Revisions

Use this form to build a URL to the **fedcatalog** web service. Notice that as you edit the form, the link is automatically updated.

Usage

Network:

Station:

Location:

Channel:

Start Time: 2010-06-07T01:00:00

End Time: 2011-06-07T07:00:00

Target Service: station

Format:

Include Overlaps: False True

Location:

All:

Lat/Lon Box:

Lat/Lon Radius:

Lat:

Lon:

Min Radius:

Max Radius:

Map



[URL for Above](#)

Federated Catalog - Geographic search

GEOFON

```
lat=-20.0
lon=20.0
maxradius=20.0
minradius=0.0
nodata=404
```

```
DATACENTER=GEOFON,http://geofon.gfz-potsdam.de
DATASELECTSERVICE=http://geofon.gfz-potsdam.de/fdsnws/dataselect/1/
STATIONSERVICE=http://geofon.gfz-potsdam.de/fdsnws/station/1/
AF CER -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF MSNA -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
GE WIN -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
```

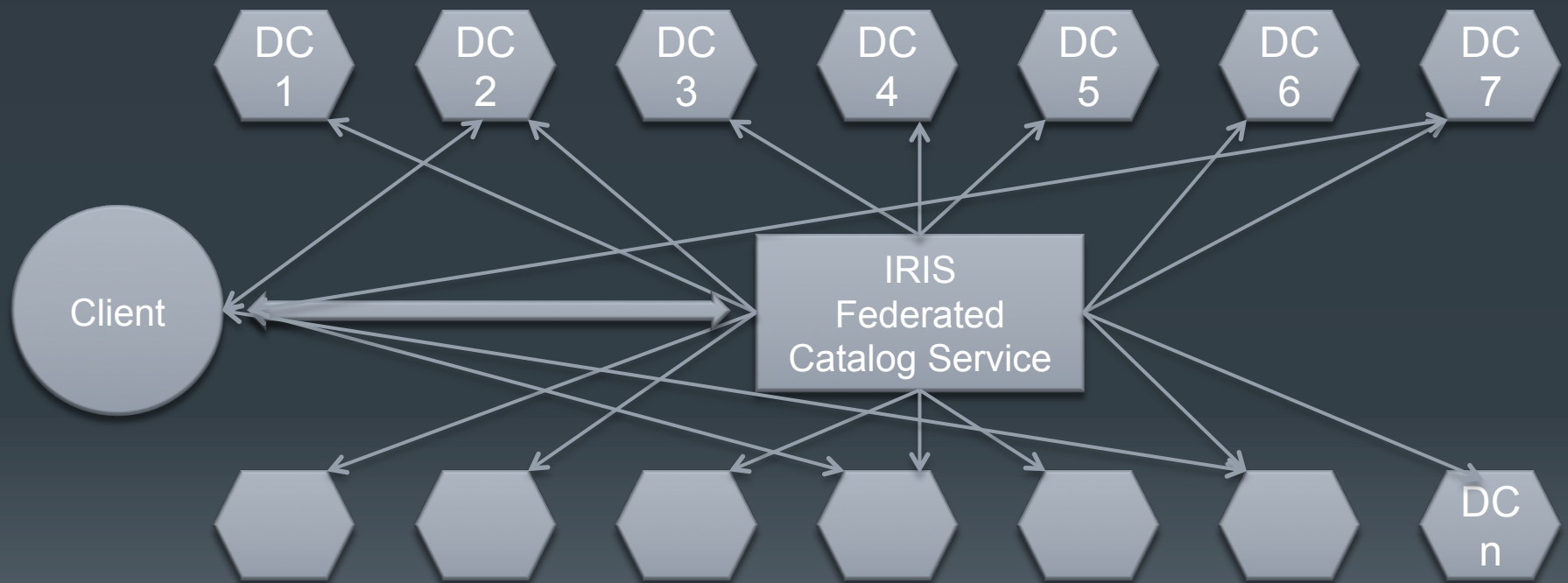
RESIF

```
DATACENTER=RESIF,http://www.resif.fr
DATASELECTSERVICE=http://ws.resif.fr/fdsnws/dataselect/1/
STATIONSERVICE=http://ws.resif.fr/fdsnws/station/1/
YV EURO 00 BHZ 2011-04-06T00:00:00 2011-06-07T07:00:00
```

IRIS DMC

```
DATACENTER=IRISDMC,http://ds.iris.edu
DATASELECTSERVICE=http://service.iris.edu/fdsnws/dataselect/1/
STATIONSERVICE=http://service.iris.edu/fdsnws/station/1/
EVENTSERVICE=http://service.iris.edu/fdsnws/event/1/
SACPSERVICE=http://service.iris.edu/irisws/sacpz/1/
RESPSERVICE=http://service.iris.edu/irisws/resp/1/
AF BLWY -- BHZ 2010-06-07T01:00:00 2010-08-02T23:59:59
AF CVNA -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF CRW -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF HARE -- BHZ 2010-06-07T01:00:00 2010-12-31T23:59:59
AF HVD -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF KTWE -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF LBB -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF MBEY -- BHZ 2010-06-07T01:00:00 2010-07-24T23:59:59
AF MBEY -- BHZ 2010-07-25T00:00:00 2011-06-07T07:00:00
AF MONG -- BHZ 2010-08-25T00:00:00 2011-06-07T07:00:00
AF MOPA -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF MZM -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF PKA -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF POGA -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF PWET -- BHZ 2010-08-09T00:00:00 2011-06-07T07:00:00
AF RUDU -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF SEK -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF SOE -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF SWZ -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF TEZI -- BHZ 2010-06-07T01:00:00 2010-08-12T23:59:59
AF TEZI -- BHZ 2010-08-13T00:00:00 2011-06-07T07:00:00
AF UFI -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF WDM -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF WIN -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF WIN 02 BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
AF ZOMB -- BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
GT BOSA 00 BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
GT LBTB 00 BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
II SUR 00 BHZ 2010-06-07T01:00:00 2010-06-25T07:59:59
II SUR 00 BHZ 2010-06-25T08:00:00 2011-06-07T07:00:00
II SUR 10 BHZ 2010-06-07T01:00:00 2010-06-25T07:59:59
II SUR 10 BHZ 2010-06-25T08:00:00 2011-06-07T07:00:00
IU LSZ 00 BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
IU LSZ 10 BHZ 2010-06-07T01:00:00 2010-12-17T13:00:00
IU LSZ 10 BHZ 2010-12-17T13:00:00 2011-06-07T07:00:00
IU MSKU 00 BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
IU MSKU 10 BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
IU TSUM 00 BHZ 2010-06-07T01:00:00 2010-07-22T18:59:59
IU TSUM 00 BHZ 2010-07-22T18:59:59 2011-06-07T07:00:00
IU TSUM 10 BHZ 2010-06-07T01:00:00 2011-06-07T07:00:00
ZP CHAM 02 BHZ 2010-08-13T00:00:00 2011-04-21T23:59:59
ZP CHIM 02 BHZ 2010-06-07T01:00:00 2010-08-31T23:59:59
ZP GABZ 02 BHZ 2010-08-11T00:00:00 2011-06-07T07:00:00
ZP IRIN 02 BHZ 2010-06-07T01:00:00 2010-08-31T23:59:59
ZP ISOK 02 BHZ 2010-08-04T00:00:00 2011-06-07T07:00:00
ZP KAMZ 02 BHZ 2010-08-13T00:00:00 2011-05-01T23:59:59
ZP KASM 02 BHZ 2010-08-12T00:00:00 2011-06-07T07:00:00
ZP KGMA 02 BHZ 2010-06-07T01:00:00 2010-08-31T23:59:59
ZP KISH 02 BHZ 2010-08-05T00:00:00 2010-11-25T23:59:59
ZP KISH 02 BHZ 2010-11-26T00:00:00 2011-06-07T07:00:00
ZP KISZ 02 BHZ 2010-08-17T00:00:00 2010-08-18T23:59:59
ZP KISZ 02 BHZ 2010-08-19T00:00:00 2011-06-07T07:00:00
ZP KMPZ 02 BHZ 2010-08-14T00:00:00 2011-06-07T07:00:00
ZP KYLA 02 BHZ 2010-06-07T01:00:00 2010-08-05T23:59:59
ZP LAEL 02 BHZ 2010-06-07T01:00:00 2010-08-31T23:59:59
ZP LOSS 02 BHZ 2010-06-07T01:00:00 2010-08-06T23:59:59
ZP LWNG 02 BHZ 2010-08-11T00:00:00 2011-06-07T07:00:00
ZP MAFI 02 BHZ 2010-06-07T01:00:00 2010-08-07T23:59:59
ZP MAKA 02 BHZ 2010-06-07T01:00:00 2010-08-07T23:59:59
ZP MANS 02 BHZ 2010-08-06T00:00:00 2011-06-07T07:00:00
ZP MKUS 02 BHZ 2010-08-08T00:00:00 2011-04-01T23:59:59
ZP MKUS 02 BHZ 2011-04-02T00:00:00 2011-04-23T23:59:59
ZP MPFK 02 BHZ 2010-08-06T00:00:00 2010-12-06T00:00:00
ZP MPFK 02 BHZ 2010-12-06T00:00:00 2011-06-07T07:00:00
ZP MUFZ 02 BHZ 2010-08-15T00:00:00 2011-06-07T07:00:00
ZP MWEN 02 BHZ 2010-08-07T00:00:00 2011-04-23T23:59:59
ZP NAMA 02 BHZ 2010-06-07T01:00:00 2010-08-13T23:59:59
ZP NJOM 02 BHZ 2010-06-07T01:00:00 2010-08-31T23:59:59
ZP PNDA 02 BHZ 2010-06-07T01:00:00 2010-08-11T23:59:59
ZP SERJ 02 BHZ 2010-08-07T00:00:00 2011-06-07T07:00:00
ZP SHWG 02 BHZ 2010-08-05T00:00:00 2011-06-07T07:00:00
ZP SONG 02 BHZ 2010-06-07T01:00:00 2010-08-03T23:59:59
ZP SUMB 02 BHZ 2010-06-07T01:00:00 2010-08-06T23:59:59
ZP TUND 02 BHZ 2010-06-07T01:00:00 2010-08-06T23:59:59
ZP UVZA 02 BHZ 2010-06-07T01:00:00 2010-08-31T23:59:59
ZP WJAC 02 BHZ 2010-06-07T01:00:00 2010-08-04T23:59:59
```


A Federated model in seismology



The Need to Search our Research and Monitoring Communities

- Standardization of request mechanisms promotes easier access to distributed data centers
- The FDSN is the only global seismological standards organization
- FDSN Web services has been shown to
 - Increase data distribution by 3-fold
 - Tools exist to let your data center be discovered in standard ways
 - Improves the ease of access for end users
 - Data returned in multiple FDSN standard formats
 - Allows data centers to
 - Directly control access to their data holdings
 - Understand the use of their data by the scientific community

How can your data center participate?

- Install SeisComp3
 - As your primary system or as a parallel system
 - BGR, ETHZ, GFZ, INGV, IPGP, Kandilli, LMU, NIEP, NOA, USP
- Develop your own web services implementation
 - IRIS, RESIF, ORFEUS DC, NCEDC, & SCEDC
 - IRIS has a reusable component to help called a web services shell
- Register your federated services with the FDSN
- Help fill the void of data centers in Asia and the Western Pacific

