Recent Arclink developments: proxy and chunk-download

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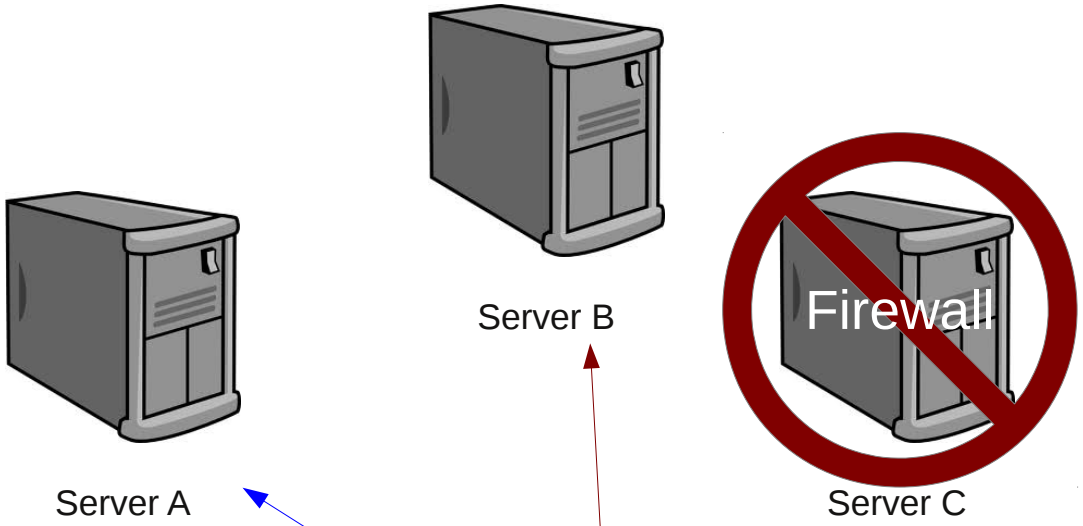
Normal mode

Normally an Arclink server does not forward requests. A client sends request directly to destination DC(s), based on routing information. The following steps are performed by an Arclink client:

- Connect to one of the primary nodes and make inventory query (eg., stations in certain region having certain characteristics). Inventory is synchronized between primary nodes (except non-shared stations), therefore it is enough to query one node only.
- Request routing–IP addresses of servers where the actual data is located.
- Based on routing, split request into sub-request and send each sub-request to the respective DC.
- If no data is received from a DC, try alternative routes.
- Each sub-request will result in a data (SEED) volume (optionally the client may merge volumes).

Normal mode (2)



GE APE 00 BHZ → Server B
GE APE 00 BHN → Server B
IU STA 10 HHZ → Server C

Inventory Request

Routing Request

Data Request

2011,1,1 … 2011,1,2 .. GE APE BH? *
2011,1,1 … 2011,1,2 .. IU STA HH? *

Proxy mode

In Proxy mode, a client only communicates with a proxy. The following steps are performed:

client Connect to proxy and make inventory query (optional).

proxy Forward inventory query to one of the primary nodes and send the result back to client.

client Send waveform request to proxy.

proxy Request routing from one of the primary nodes.

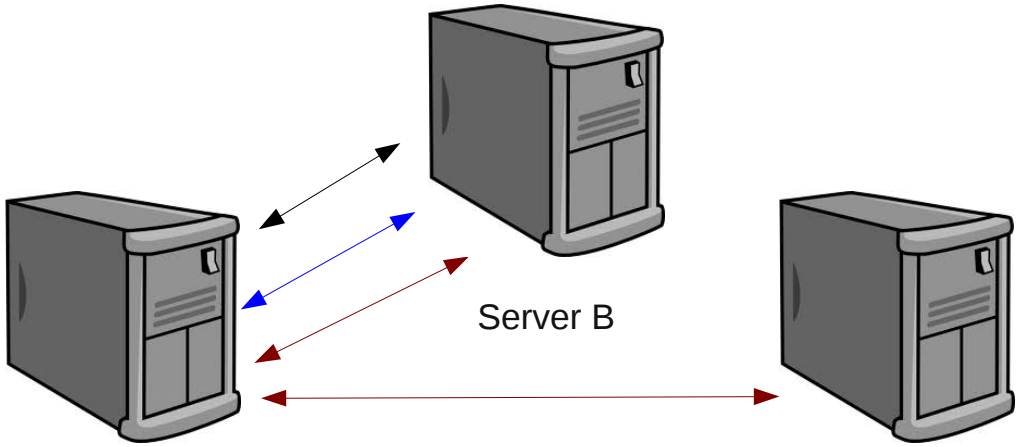
proxy Based on routing, split request into sub-request and send each sub-request to the respective DC.

proxy If no data is received from a DC, try alternative routes.

proxy Each sub-request will result in a data volume.

client Download result from the proxy, optionally merge data volumes.

Proxy mode (2)



GE APE 00 BHZ → Server B
GE APE 00 BHN → Server B
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Inventory Request

Routing Request

Data Request

2011,1,1 … 2011,1,2 .. GE APE BH? *
2011,1,1 … 2011,1,2 .. IU STA HH? *

Differences for client

- In proxy mode, client should skip routing request and send waveform request to the proxy.
- In normal mode, client usually receives one data volume per server. Client typically uses the command "DOWNLOAD <reqID>" to download data.
- In proxy mode, the result usually contains multiple data volumes (one per sub-request). It would be recommended to download each volume separately using "DOWNLOAD <reqID>.<volID>".
- The arclink_fetch client has been modified to take the above into account.

Arclink proxy and SC3

It is possible to configure SC3 to use Arclink proxy, but the following should be kept in mind:

- If the request is forwarded to multiple DCs, SC3 will wait until all DCs have finished processing the request.
- Arclink does not give any guarantees about processing time. Usually requests are fulfilled quickly, but if a datacenter is busy, then processing of a request may take very long time.
- Arclink encryption is currently not supported by SC3, however, it is possible to specify username using the following syntax:

```
recordstream.service = arclink
recordstream.source = webdc.eu:18001?user=andres@gfz-potsdam.de
```

Classic download modes

Arclink traditionally supports two download modes:

- Normal download (DOWNLOAD command) returns error if the request is not yet ready (client should use STATUS command to find out when the request is ready).
- Blocking download (BDOWNLOAD command) blocks the connection until the request is ready.

In either case, the client wouldn't get any data until the request is ready at the server.

Chunk download mode

- The idea of "chunk download" is that a client starts getting data immediately, even before the request is finished. The server may not store the result locally at all, but extract data in chunks that are directly sent to client. This would be possible with Mini-SEED (not with full SEED).
- Since the download size is not known beforehand, a protocol extension was developed. The command for chunk download is called "BCDOWNLOAD".

Normal download

(client→server) DOWNLOAD 395629
(server→client) 1000
(server→client) <1000 bytes of data>
(server→client) END

Chunk download

(client→server) BCDOWNLOAD 395629
(server→client) CHUNK 512
(server→client) <512 bytes of data>
(server→client) CHUNK 488
(server→client) <488 bytes of data>
(server→client) END

Implementation of chunk download

- Chunk download is preferred by SC3 clients (manual picker, etc.). BCDOWNLOAD is tried first; if not supported (server replies ERROR), BDOWNLOAD is used.
- Arclink proxy application supports chunk download for local (SDS) data.
- Chunk download is not supported by the standard Arclink server.
- Some experimental Arclink server implementations support chunk download only.